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* Short Features — a few of the many in this issue.

The Farmer's Digest

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The Farmers Digest
Volume 16 January 1953 Number 7

Cheaper Gains for Hog Growers

Let's Look at Some New Feeding Ideas and Three Litters a Year . . .

Condensed From Missouri Ruralist

Cordell Tindall

MORE new ideas have come along in recent years for growing hogs than for other kinds of livestock, particularly new ideas in feeding.

Time was when corn was the chief and only hog feed. Then it was shown that a protein supplement made corn go a lot further in making pork. But check the tag on some of the newer feeds for pigs and hogs. You'll find such terms as riboflavin, terramycin, aureomycin and dozens of other names unfamiliar just a few years ago. And for a list of really fancy names check the tag on the new synthetic sow's milk. Emphasis on these essential animal feed ingredients for little pigs is sure to lead to better feeds for growing and fattening hogs, too.

Some hog growers are turning to synthetic sow's milk, creep rations, dairy feeds, semiconfinement and concrete feeding floors in a trend to specialization that concentrates the hog enterprise on the farm. Other hog producers have found pasture, especially ladino clover, a source of cheap gains and many growers are trying to "graze" hogs with minimum grain, then finish them quickly on corn.

One goal is in common — an attempt to grow hogs more cheaply. Hog profits have been slim the last year. One reason for turning to new ideas is the need for cheaper gains.

Let's look at some of the new

Reprinted by permission from Missouri Ruralist
Kansas City, Missouri

ideas in operation on Missouri farms.

Keen interest is being shown in use of synthetic sow's milk, which was first available for litters last spring. With typical Missouri caution most hog men have given the new pig feed a limited trial to see how it works. These early tests are very promising.

Synthetic sow's milk is a complete pig feed containing all growth essentials. It is a powder that is mixed with water—which then looks like milk. Pigs can be taken away from sows at 48 hours, fed the synthetic milk, weaned at five or six weeks old.

A good hog producer who has turned to synthetic milk is A. B. Shaver of Plattsburg. He has been raising about 900 hogs a year on his fertile Platte county farm. He's been trying to grow them on clean ground but the large number of hogs on a medium size farm has just about made this impractical.

In converting his system to use of synthetic sow's milk he farrows in a colony house with a concrete floor. He uses big brooders and guardrails and when pigs are 48 hours old he takes the sows away, puts several litters in one pen.

Pigs must be fed every three hours when they are small, and he starts feeding at 6 o'clock in the morning and feeds every three hours until 9 o'clock at night. This labor is the only objection he has to the new system—it's as confining as dairying. One man wouldn't get much other farm work done in the day. Mr. Shaver feels the system calls for a trend to specialization.

Actually, the feeding is not much of a chore. He mixes the milk in a churn and has built some long tin pans for slopping the pigs. Wooden dividers fit into the pan so every pig has its stall —another advantage for the system.

The long pan filled with milk is kept out in the central corridor of the farrowing house, and pigs are let out of the pens to feed. By feeding time they make a terrific noise, as they are hungry, and freely express themselves.

How does he get them back? As soon as they are full, and they are given all they will drink at the moment, they are easily driven back into their pens. You might think pigs would be more contrary than this, but we watched the feeding operation and it went smoothly.

Of course, as the pigs get older they are not fed so often. But if farrowing is strung out to get maximum use of farrowing equipment this means a longer period of frequent feeding.

Mr. Shaver leaves his pigs in the farrowing house until they are two weeks old, then they are moved to outside shed type houses where they still are confined to

pens. Self-feeders are in these pens and as soon as the pigs will eat, Mr. Shaver begins to feed a creep ration. And part of the success of this operation is use of a really good pig starter feed.

As pigs eat more and more solid feed they eat less and less of the milk—and are weaned at five weeks. It requires about 10 pounds of powdered milk for every pig—and one popular synthetic sow's milk is selling at 35 cents a pound at present.

When we visited the farm he had about 250 pigs on synthetic milk, so you can see he is giving it a good test. How is it doing? He is well pleased with growth of pigs. His brothers have been critical observers of the operation and are of the opinion Mr. Shaver's pigs are as large at six weeks as they formerly were at eight weeks.

Pigs on synthetic milk do not have the "bloom" shown by pigs on a good nursing sow. Their hair is not as slick but they seem to be growing rapidly.

Mr. Shaver moves his pigs at six weeks to pasture. He breeds his sows again 10 days after they farrow. Thus, it will be a simple matter to get three litters of pigs a year. It would appear the rapid rebreeding of the sow is not as trying on her system as suckling a litter of pigs. The sows do not lose much weight.

We heard of one small operator at St. Joseph who took the pigs from gilts at 48 hours, then shipped the sows to market in a few days. The sows had lost very little weight, dried up quickly and sold as fat hogs. The owner figured he got the pigs free.

Mr. Shaver makes one point—sows should be fed a good balanced ration and kept in good health. He full-feeds sows. This business of three litters a year fits in with the specialization trend with hogs, too.

Another big operation with synthetic sow's milk can be found at McDowell farm, near Blackwater, Missouri. Bill Bagby, manager of the purebred Duroc breeding farm, explained their operation.

An old machinery shed has been converted to a hoghouse with concrete floors added. A special pig battery has been purchased and will be used for cold weather farrowing. It is planned to keep pigs in the battery three weeks, then move them to the big shed. In warm weather the big shed also serves as a farrowing house.

Mr. Bagby turned to the system because of trouble keeping hogs on fresh ground. He washes sows thoroughly before they farrow, believes this cuts infection from worms.

Unique method of mixing the milk is used here — old electric washing machines are used.

Operation at McDowell farm

is similar to that described at the Shaver farm. Here, we saw some older hogs. Mr. Bagby reports his spring pigs weighed 200 pounds at 4½ months—quite a gain. He weighed the pigs at birth and they weighed four pounds.

Most Missouri hog growers probably will be more like Foster H. McCullough at Polo. He's trying synthetic milk on a small scale. This fall he is giving the milk to 83 pigs—and in the first two weeks he hadn't lost a pig after taking them from the sow. This is one of the obvious advantages of the system, saving more pigs. It would be possible, too, to keep big sows that would have more pigs when danger of sows laying on them is lessened.

Mr. McCullough put his pigs in a chicken brooder house but had trouble with his litter of straw getting in the milk trough.

Incidentally, Mr. Shaver used ground corncobs for litter, the McDowell farm had their pigs on concrete.

Mr. McCullough started breeding his sows on the seventh day. He plans to have three litters a year, too.

This hog grower has pigs on sows, too, and he is watching the performance of the two groups of pigs closely.

From observation of these three operations in Missouri it would appear that with synthetic milk there's more labor but you save more pigs. With the milk a good starter ration is needed.

J. W. Tweedie, Carroll county, has set up a system of semiconfinement in growing hogs. He turned to this plan because he had found hogs damaged his soil saving terraces when allowed to run out on pasture. Providing temporary fencing and water for the hogs also were factors in the switch to the new system.

In the system he has three pens for fattening hogs, each 175 by 60 feet, side by side. At one end is the concrete floor, 26 feet wide with automatic waterers, self-feeders for grain and supplement, and troughs for feeding a dairy feed that is mixed with water.

The shed-type houses have floors with cracks in them. Dirt from hogs falls through cracks in floors and there's no dust in houses. Alfalfa was sown in one end of pens but didn't last long.

Pigs are put in lots when 10 weeks old. There were 62 hogs in each pen, and there was scarcely enough shade.

The hogs went to market weighing around 200 pounds. First pigs were farrowed on February 10, last around March 10. Second bunch of hogs were marketed about September 10. The hogs had that thrifty look.

How does he like the system? Fine! The hog enterprise is concentrated, the concrete floor is easily cleaned, feed and water are

convenient.

Opinions will probably always differ on feeding in confinement or on range. For what it's worth, consider the experience of Byron Boone, Fairfax, Missouri. In 1951 he had two lots of hogs. He had a new concrete feeding floor adjacent to his barn and here he fed 100 hogs. Another 130 hogs were fed out on pasture. Hogs in dry lot went to market three weeks to a month earlier, weighed 204 pounds. It was his opinion these hogs made the most money.

This year he had his hogs out on pasture, then brought them in to the feeding floor. Why! His answer is that no two bunches of hogs feed out alike.

Earlier we mentioned a good starter pig ration was an essential companion to synthetic milk. The starter ration appears to be a good money maker to pigs suckling sows, too. John Buckler, breeder of purebred Spotted Poland China hogs at Mound City, reports he fed a ton of starter ration to 80 pigs. First pigs were farrowed about February 21 and started to eat when about three weeks old. Pigs arrived until April 12. The hogs went to market on September 15 weighing 195 pounds—made economical use of some good alfalfa pasture.

Last spring we talked with a lot of hog producers who were planning to use pasture this summer with minimum grain. Dry weather that slowed the growth of ladino clover changed plans in some sections. But in northwest Missouri there was plenty of rain and we saw a bunch of thrifty hogs out on excellent ladino clover.

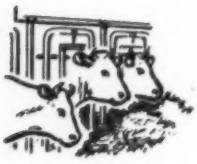
Brome, 2,4-D Team Against Leafy Spurge

Research at South Dakota State college has shown that seeding bromegrass in land infested with leafy spurge, then spraying with 2,4-D, will help kill spurge.

Since bromegrass is highly resistant to 2,4-D and spurge is less resistant, the spurge is killed back to the crown and the brome continues to grow.

Lyle Derscheid, South Dakota State college weed researcher, reports that one and a half pounds of the ester form of 2,4-D per acre, applied when the upper leaves of spurge turn yellow, will kill the spurge plants back to the crown.

When the leaves grow back to the yellowing stage, they should be sprayed again. If the spurge plants are not killed the first year, spraying in the same manner the next year may be necessary to kill the leafy spurge. —*Successful Farming*



Results of Latest Research on

KETOSIS in Dairy Cattle

Condensed From Farm Research

L. H. Schultz

IF YOUR best cow goes "off feed," declines in milk production, and loses weight during the 10 days to six weeks after calving when she should be doing her best, the trouble probably is *ketosis, or acetonemia*. Both names refer to the same condition, but ketosis is the correct term. It refers to an accumulation of ketone bodies (products of fat metabolism) in the body. They appear in the blood and are eliminated in the urine, milk and breath of the cow. A common diagnostic test for ketosis used by the veterinarian is a rapid urine or milk test for these ketone bodies. Some people call the disease *sugar sickness* because a low level of sugar in the blood accompanies the high level of ketone bodies.

The symptoms follow the changes in blood sugar level more closely than the changes in the level of ketone bodies. Usually the cow is depressed and dull, but sometimes in the advanced stages she may exhibit nervous symptoms, being extremely excitable and touchy, or she may show incoordination when moving. Occasionally the spine is arched and curved and the head twisted to one side. Most of the trouble is encountered during the winter from November to April, although some cases do appear on pasture.

There are no reliable figures on the number of cows affected with ketosis yearly. Investigation of the records of one 30 cow herd over a period of seven years (1941-'47) showed an average of 2.1 cases per year, with a range from zero to six cases in individual years. The average drop in production despite prompt treatment was 21.5 pounds per day and the average time for recovery was 20.1 days. The fact that ketosis seems to be on the increase has been attributed to increased forcing of cows for higher production. Also, as the disease becomes better known it is more often correctly diagnosed. It is true that the best cows in well fed herds

Reprinted by permission from Farm Research
Ithaca, New York

seem to be the most susceptible.

The standard treatment over the years has been the injection of sugar (glucose) into the jugular vein. This treatment is an attempt to correct the low sugar level of the blood, and is a sound one.

Chloral hydrate, a drug with a sedative action has been used with some success. It was originally used to quiet animals that were excitable and nervous, but it also appears to have some value for non-nervous cases.

Cortisone, a hormone from the adrenal gland, has also been used successfully. It is injected into the muscles, and apparently stimulates formation of sugar from other substances in the body. At the present time its use is limited because of the high cost.

Research on ketosis at the Ithaca experiment station was designed primarily to study causes and prevention. Interest was centered on the rumen of the cow because the main species of farm animals affected are the ruminants. Certain acids are important products of bacterial action in the rumen and the animal gets considerable use from these substances. The important acids produced are *acetic* (the vinegar acid), *butyric* (found in butter), and a similar one called *propionic*.

To determine the effect of excessive production of these acids, each one was injected into the rumen of normal goats and the changes in the blood were followed. Acetic gave no marked change from the normal. Butyric caused a marked increase in ketone bodies and a decrease in sugar. Propionic caused no change in ketone bodies, but a marked increase in blood sugar. From this experiment it was concluded that, from the standpoint of ketosis, increased production of acetic acid in the rumen would not have much effect, that extra butyric would be detrimental, and that extra propionic would be beneficial because it caused such marked increases in blood sugar.

The next step was to measure the fatty acids present in the rumen of cows with ketosis. Each of the three acids was found to be low. Apparently none of them was being produced in normal amounts.

Sodium Propionate for Treatment

Because all of the acids being produced in the rumen of ketosis cows were low and because propionic acid seemed to be rather specific for increasing the sugar level in the blood, a salt of propionic acid was tried for treatment. Sodium propionate was used because it was the most readily available. The cost is about 50 cents a pound.

The response of the first cow treated with one-fourth pound of sodium propionate daily in two

administrations was satisfactory. In 10 days she was eating well and the milk production and blood picture had returned to normal. To date information is complete, including the blood picture, on 25 cows treated with propionate. These cows all responded well, with the exception of one that turned out to have a bad uterine infection. Three of them showed relapses and were treated a second time.

The material, a white powder, was most effective at levels of one-fourth to one-half pound daily (divided in half and given twice daily). The treatment period was usually 3 to 10 days, depending upon the response. In the mild cases where the cows were still eating grain, they were fed the material in the grain at the one-fourth pound daily level. In the more severe cases it was used at the one-half pound daily level, and was given by capsule or drench. It is rather unpalatable so was difficult to feed in the grain at this level. Besides, in the more severe cases, the cows were eating little, if any, grain. It is not known whether sodium propionate will prove helpful in preventing ketosis, but work is in progress to find out.

It is felt that the use of sodium propionate offers a valuable additional tool to aid the veterinarian and the dairyman in reducing losses from ketosis, either alone or in combination with other accepted treatments. Exactly what causes a cow to come down with ketosis in the first place is still not well understood, but research continues on that point.

Fall Freshening Pays

Fall freshening cows produced 300 pounds more milk and returned $57 more over feed costs than cows that freshened in March, April and May, and this in spite of the fact that the fall milk price was only slightly higher. This is seen in the records of 666 cows in New Jersey Dairy Herd Improvement Associations.

Winter and summer fresheners averaged $23 to $30 more over feed costs than spring cows. It's not easy to have most of your cows drop calves in fall and winter, but much can be done toward this goal by paying strict attention to time of drying off, heat periods and breeding dates as shown on the breeding record sheet.

—*New Jersey Farm and Garden*

Tests at Purdue University have shown that 48 feet of feeder space per 100 hens helped produce five to seven per cent more eggs than when the usual 24 feet of feeder space was provided.

A Winterproof Stock Waterer

Just 3½ Kilowatts Per Day Assures Plenty of Drinking Water for 105 Hogs and 25 Cows

Condensed From Electricity On The Farm

Harry Barton

NEW insulated, electric stock tank heaters have many advantages. They are safe, clean and operating cost is reasonable. They provide warm water to help stock utilize expensive feed. Could you make use of such an installation?

Arthur Wall, who owns a farm in Andrew County, Missouri, made just such an installation last winter. He had had so much trouble with his oil burning tank heater that he knew there must be a better way. So, despite the fact that he had to dig in frozen ground, he put in an electrically heated automatic stock waterer just before Christmas. The unit is insulated, has swinging doors over the head holes where hogs are watered, and is thermostatically controlled. Mr. Wall was naturally interested in just how well the new waterer would work. As far as operating cost was concerned, he knew from neighbors' experience that it would be low. What's more, on cold days his old tank heater had used as much as four gallons of oil in a 24 hour period. But he wanted to check and be sure.

Consequently, a check meter was installed in the electric line supplying the waterer. Daily minimum and maximum temperatures as well as daily electrical consumption, were recorded. Water was supplied at 46 degrees for 105 hogs and 25 head of cattle. The records were kept from January 1 through March 31, 1952.

During this period there were 10 days when the thermometer didn't get above freezing. Temperatures ranged between 3 and 30 degrees. Electrical consumption averaged 6.2 kilowatt hours per day for this time.

There were another 29 days in which the temperature ranged

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New York City

between 10 and 40 degrees. Electrical consumption averaged 4.2 kilowatt hours per day for this time.

For the entire 91 day period in which temperatures ranged from 3 to 74 degrees electrical consumption averaged 3.56 kilowatt hours per day.

By month, the electrical consumption was 98 kilowatt hours in January, 125 in February and 101 in March for a total of 324 kilowatt hours for the season.

Mr. Wall was very much pleased with the reduction in the operating cost afforded by his new waterer. However, he figures there is a greater advantage in the increased efficiency he gets from the feed consumed by his livestock. It doesn't take a livestock specialist to determine that it is far cheaper to heat water than to use feed consumed by the animal to raise the temperature of ice water. On top of that, livestock will not drink a sufficient amount of ice water to utilize their feed efficiently.

The automatic electric stock waterer has also cut Mr. Wall's chore time considerably. It is no longer necessary to refuel the tank heater, clean out the tank due to soot and oil-slick settling on the water, or to chop ice due to the fact that the tank heater has gone out on a windy night. The worry of fire hazard caused by flying sparks is eliminated.

Hog Raising Outlook Average

Because of smaller pig crops this year, economists of the United States department of agriculture point out that farmers are likely to have fewer hogs to market in the first eight months of '53 than they marketed in the same months of '52.

How many hogs go to slaughter in the later months of next year will, of course, depend on the size of the pig crop next spring. But the price of hogs compared with corn prices this fall is averaging a little less than usual for this time of the year. Everything considered, the economists see little prospect for much change in the size of the spring pig crop.

If the demand for meat doesn't change much, prices of hogs next year seem likely to average as high or a little higher than this year. On the other hand, the specialists expect prices of corn to run a little lower than this year. As the prospects figure out, the price of hogs compared with the price of corn will be about average. Average relationship between hog and corn prices would allow farmers about average returns from raising and feeding hogs.

— University of Nebraska

Cloud Doctors

Big Rain Stimulators Now Find Steady Customers

Condensed From The Wall Street Journal

Richard B. Cole

RAIN making, once the stock in trade of primitive medicine men, has gone respectable as scientists have built up evidence they can change the weather over limited areas.

Industry and agriculture are now putting the cloud squeezers to work providing more water to aid plant and tree growth, more for power generation, more for drinking and for putting out costly forest fires.

But before rain making won this recent acceptance it went through a period when it wasn't wholly free from some taint of witch doctoring.

In late 1946, a General Electric team headed by Nobel Prize winner Irving Langmuir successfully changed a cloud into rain by peppering it with dry ice crystals dropped from an airplane.

Fly-By-Night Era

This experiment, winning a good bit of attention, prompted a number of amateur weather experts to take up rain stimulation. Most of them were wartime pilots who had learned a little meteorology. Some were ranchers who operated their own planes. Down in Cuba, one fast operator briefly earned living expenses at a sugar plantation while he shot into rain clouds cartridges that had been coated with a "secret chemical."

But within a couple of years the General Electric pioneers showed it was more economical to float rain inducing silver iodide into clouds from the ground than to drop dry ice from planes and the meterological knowledge required to carry out this process successfully drove the fly-by-night operators from the field.

At present, according to E. K. Spengler, executive secretary of the American Meteorological Society, over 90 per cent of the serious rain work is done by three firms organized in the past year or two. These are Water Resources Development Corp. of Denver, headed by Dr. Irving P. Krick; W. E. Howell Associates,

Reprinted by permission from The Wall Street Journal
Chicago 90, Illinois

Inc., of Cambridge, Massachusetts and North American Weather Consultants of Pasadena, California.

For their clients the rain experts claim they are doing things like this:

Producing more water for power generation to assist Aluminum Co. of Canada in Quebec and copper and zinc producing Cerro de Pasco Corp. in Peru.

Inducing more rain to help Gaylord Container Corp. of Louisiana, and Marathon Paper Mills of Canada, in their log driving, forest fire prevention and tree growing.

Seeding clouds over hundreds of millions of acres in the western part of this country to benefit farmers and ranchers, and providing more rain in Cuba for sugar cane which is 80 per cent water.

Stirring up in the Connecticut River Valley at a cost of $8,300 a heavy rainstorm estimated to be worth five million dollars to tobacco growers alone.

How They Do It

Just how do the rain makers operate?

First off, they emphasize, they don't "make" rain where no clouds exist. Rather they say they stimulate rainfall that wouldn't otherwise take place by "seeding" clouds with silver iodide crystals carried up from ground generators by rising air currents. Dry ice, the original stimulator, isn't used much these days.

In towering cumulus clouds, which pack a lot of moisture, temperatures may run as low as 40 degrees below zero Fahrenheit without the supercooled droplets joining to form ice crystals. For crystal formation the moisture drops need a nucleus such as grains of dust, or sea salt, or minute ice crystals to which they can adhere.

And the nuclei, say the scientists, must be "activated," meaning the tiny crystals must have the power to attract moisture. Ordinarily this activation develops at temperatures between 40 degrees below and zero degree Fahrenheit. Then ice or snow drops form, and fall, and melt into rain.

Cloud seeding involves the introduction of silver iodide crystals into a potential raincloud. They have been found to become activated nuclei at far warmer temperatures of 20 to 25 degrees above zero Fahrenheit. When they're present, clouds do not have to become so deeply supercooled for precipitation to start, so rainfall from a seeded cloud begins earlier and lasts longer, according to rainmaker theory.

Up on the Updraft

When thick clouds are nearby there are always updrafts or rising convective currents, say the meteorologists. So these scientists light one of their generators upwind from the target area where

they want rain and the currents carry silver iodide crystals up into the cloud. Some seeders burn coke impregnated with the chemical, others dissolve it in acetone and burn the mixture in liquid petroleum gas. Their generators are inexpensive, costing $200 to $400.

Dr. Wallace E. Howell of Cambridge, who collaborated in early cloud physics study with Dr. Langmuir, has made a specialty of serving industry in its search for more water. He was the cloud seeder who helped procure extra water for New York city in late 1950—he estimated the amount at 24 billion gallons.

Last year Dr. Howell did cloud seeding for Aluminum Co. of Canada and its adjoining neighbor, Shawinigan Water & Power Co., and recently the two companies signed contracts for expanded operations this coming year. For the two, Dr. Howell estimates he brought an 18 per cent increase in rainfall over a 46,000 square mile area. He totals up the extra water at 750 billion gallons, enough to fill New York city's Croton and Ashokan reservoirs three times over.

Rain in the Andes

Also last year Cerro de Pasco Corp. and sugar growing Gildemeister & Co. joined to give Howell Associates a contract, recently extended at what the mining company terms a "six figure amount" for seeding operations designed to extend the rainy season in the Andes. Such extension could have the same effect as costly expansion of the two companies' reservoirs.

In Cuba Dr. Howell is helping around a dozen sugar companies to get more of the water that's so essential to their operations. Perhaps his greatest success has been at the plantation of Francisco Sugar Co. in Camaguey province where he calculates he increased rainfall 29 per cent in the fall of 1951 as compared with precipitation on three surrounding plantations.

"We accept Dr. Howell's figures without any discount," says B. Rionda Braga, president of the company. "We've just received our contract for an indefinite period."

With a group organized a year ago last spring and now numbering 37, including 24 meteorologists, Dr. Howell is now doing business at an annual rate of better than $500,000.

Krick of Colorado

A year older, and larger, is Water Resources Development Corp. of Denver, whose Dr. Krick helped President-elect Eisenhower decide the date for D-day in Normandy. This firm has around 110 full time employees.

With some 30 active contracts in 14 western states and Mexico, Dr. Krick's group this year is try-

ing to stimulate rain on about 200 million acres. He has 75 per cent of New Mexico and 60 per cent of Utah under contract with local groups of farmers and ranchers. His mailing list of contributors to the financing of local operations tops 50,000.

This summer the Krick organization was heartened by a report from a group of experts appointed by Gov. Thornton of Colorado showing that in 33 sections of that state which were cloud seeded last winter the water content of snowpacks was 25 per cent to 100 per cent greater than the average for the past 16 years.

North American of Pasadena

North American Weather Consultants, centered in Pasadena, has three large public utilities among the 12 clients for whom it is stimulating rainfall. It estimates that, since it started operating, it has produced 24 per cent more drinking water for Santa Barbara than the city would have had without its aid. For a fee of $6,000 it once put out a forest fire in the Tillamook area of Oregon that might have caused heavy damage.

As evidence of cloud seeding accomplishments has accumulated, some of the earlier doubts about this new activity are beginning to evaporate. The United States weather bureau has been one of the outstanding skeptics, but now the bureau's chief, Dr. Francis W. Reichelderfer, has this to say: "We know very well that moisture can be stimulated through cloud seeding by silver iodide crystals or dry ice."

The biggest bugaboo of the cloud seeders is the conflict of interest between those who want more rain and those who don't. This conflict will limit rain making operations to one economy areas like the farm and grazing sections of the west, or remote water storage and forested areas, or the sugar growing part of Cuba.

Trouble in New York

Recalling what happened after the New York experiment of 1950, most rainfall people won't operate in populous sections. Along with his extra water, Dr. Howell brought whopping lawsuits to New York city in 1950, with damages of $2,500,000 claimed by Catskill mountain resort operators. The suits haven't been tried as yet.

This summer, however, Dr. Howell was put on the spot by a group of Connecticut River Valley growers of tobacco, potatoes and other crops whose fields were almost burning up as the result of a 37 day drought. "You rain makers had better put up or shut up," he was told by a group of 75 people who hastily organized Disaster Relief & Research Administration, Inc., to hire a rain stimulator.

So on August 5 he seeded a huge moisture bearing cloud mass and on that day there began a series of storms which dumped three to four inches of rain on east central New England.

Dr. Paul J. Anderson, director of the Connecticut agricultural experimental station in Windsor, stated that before the rains it looked as though the valley's crop of cigar wrapper and binder tobacco, normally worth over 40 million dollars each year, would be cut 40 per cent to 50 per cent by the drought. But the rains lowered the reduction yield to 15 per cent to 20 per cent he said, adding, "this made the gain in value from the rains at least five million dollars."

Foreign countries now want to get into the rain making act. North American Weather Consultants, expecting its 1952 gross to reach $250,000, sees its volume doubling next year as a result of foreign business. Howell Associates is currently dickering with Egypt, Madagascar, Sicily, French West Africa and Israel, while Dr. Krick's big outfit has had requests for information from "a number of foreign countries."

Blames Muddy Barnyards as Cause of Foot Rot

Wet, muddy ground spreads foot rot in two ways, says Dr. W. B. Durrell of Vermont. First, the germ which spreads the disease can only live in moist ground. Second, when cows stand or walk in moist dirt, the skin between the claws gets soft and bruises easily. The germ then gets into the foot through the bruise.

Once in the herd, foot rot strikes at the herd, causing heavy losses. Some of the effects of the disease are lameness, rapid loss of weight and lower milk production. Often much treatment and care is necessary to bring the cow back to good health. Probably foot rot has not been a widespread problem this past summer because it has been quite dry.

Hard surfacing, especially with concrete—plus good drainage—is the key to foot rot control. Another good method is to gravel the yard. Barnyard at University of Vermont farm was graveled at a cost of $450 but the average barnyard for a 25 cow herd might not cost any more than $175. Dr. Durrell figures that the cost of surfacing will be paid back in a year's time through savings in treatment cost and in increased milk production. — *Vermont Extension*

Antibiotics in swine rations result in feed savings up to $2.28 per hundred pounds gain, according to Iowa State college researchers.

New Way to Harvest Alfalfa Seed

— Chemical Curing Gets Twice the Yield

Condensed From Farm Journal

John A. Rohlf

NOT since the days when 2,4-D was introduced have Kansas farmers been so enthusiastic about a chemical—one that "works just like a frost" on their alfalfa seed fields.

You spray a field about the time you would ordinarily start to mow and windrow. That's when most of the seed pods are ripe, but the alfalfa plants are still too green to thresh.

What happens? In two or three days, the plants (and the seeds) are as dry as tinder. You roll in with your combine and "thresh her standing" — just like wheat.

"Works like a charm," report the hundreds of Kansas farmers who gave the method (called "chemical curing") a real try-out this year. They got some mouth watering yields, too.

A whopping 960 pounds per acre — 17,280 pounds from 18 acres — was reported by Harvey Way, Meade County, Kansas. In Finney County, Ralph Jameson straight-combined a 40 acre field that averaged 960 pounds, and Ora Schopf had 75 acres that made 720 pounds. Another west Kansas grower, Paul McManaman, harvested 400 acres that averaged 360 pounds of seed per acre.

These yields were exceptional, of course, but 250 pounds was so common that it barely made Saturday night conversation.

Quite some yields in country where the long-time average is about 100 pounds! Best of all, prices were ranging from 30 cents a pound for straight combine-run seed, to 75 cents for certified.

Chemical curing doesn't deserve all the credit for these record breaking yields. The dry summer played the biggest part. But many farmers are quick to agree that their chemically cured fields made just about twice as

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Philadelphia, Pennsylvania

much seed as the fields they mowed and windrowed before combining. Tests at Hays, Garden City and Manhattan showed 35 per cent more seed from treated plots.

Chemical curing cuts down shattering. You lose lots of seeds during cutting and raking. Worse yet, if a strong wind tosses the windrow around a bit, you soon have stems and little else.

Here's the treatment that most Kansas growers used: Two pints of a dinitro compound, mixed with from four to eight gallons of diesel oil per acre. This chemical is usually sold as a weed killer under various trade names.

The amount of spray mixture used depends on how thick the alfalfa is. The dinitros aren't taken inside the plant and moved from one leaf to another, the way 2,4-D is. You have to get good coverage of the plants; otherwise too many of the leaves will stay green.

How much does this "chemical frosting" cost? From $6.25 to $7.50 per acre, say the Kansas growers, including the chemical and getting it on. Airplane spraying is best, since ground rigs drive down quite a few plants.

The chemical works best if the weather is sunny and dry after spraying. Farmers who had clear, hot weather reported that their fields were ready to combine in two or three days.

If you ordinarily combine only four or five acres a day, better not treat more than 20 acres at one time. Otherwise, the plants may get to dry, and you'll have trouble separating the seeds from the powdery chaff.

Some Kansas farmers used other chemicals — pentachlorophenol, for one. Usual dosage was three to five pounds of pentachlorophenol in 8 to 10 gallons of diesel oil per acre.

Still being tried on an experimental basis are other chemical sprays, including Endothal, and several that are known only by trade numbers.

Chemical curing has caught on fast on the west coast. Last year, at least one-fourth of California's seed crop was cured for straight combining.

Kansas scientists started working with chemical curing in 1948. Seed crops were poor in 1950 and 1951, however, and it wasn't until this year that the idea really took hold.

A good share of the credit for introducing the idea to Kansas goes to C. O. Grandfield, Kansas experiment station. For years, Grandfield has campaigned for bigger seed crops.

He hammered away for more and better use of bees, and set up test plots to show how spraying with chemicals such as DDT and toxaphene would control lygus bugs and webworms, and boost

seed yields.

Last summer, Grandfield took a swing around the state to look at his plots. He also stopped and walked through farmers' fields, and saw that the exceptionally dry weather was setting the stage for a bumper seed crop.

When he got back home, Grandfield rushed a letter to every county agent in the state.

"Tell your farmers," wrote Grandfield, "that chemical curing will really pay off this year." Along with the letter went instructions on how to do it.

Grandfield sat back, crossed his fingers, and waited. But the quiet didn't last long. During the next six weeks, he was bombarded with visitors, letters, telegrams and telephone calls. From 88 county agents came letters reporting excellent results, along with their thanks for the "hot tip."

Kicks? They were few and far between, and that's highly unusual, considering that chemical curing is practically a brand new practice. But the farmers who pocketed an extra $100 or more an acre from their alfalfa seed crop this year—well, they're not kicking. Not a bit.

New Spray Mixture Has More Lasting Power to Kill

A virtually invisible and longer lasting insect killing mixture has been produced in experiments by the United States department of agriculture. By mixing the insecticide, Lindane, with a chlorinated polyphenyl (a resinlike material), research workers of the bureau of entomology and plant quarantine have produced a substance that retains its power to kill susceptible insects at least twice as long as do normal Lindane sprays. In addition, the Lindane mixture when applied to a surface develops none of the usual whitish powder deposits, but remains practically invisible throughout its toxic life.

The research team found that the Lindane-chlorinated polyphenyl mixture (used at the rate of 50 milligrams of actual Lindane per square foot) would kill 80 per cent of all cockroaches exposed for two hours to a 60 day old treated surface. It remained lethal to 66 per cent of the roaches after 90 days. Regular Lindane sprays used at the same rate, killed only four per cent of the roaches after 60 days.

— Farm and Ranch News

Inflation Increases Cost of Keeping Rats — Cost of living has gone up for rats, says T. H. Parks, Ohio State University. "A rat can no longer be boarded as cheaply as $2 per year formerly estimated. It is more like $5 now." Farmers will have to foot the bill or get rid of the boarders.

POOR HAY

— Will Produce Quality Steers if Protein Supplements Are Used

Condensed From Ohio Farm and Home Research

Earle W. Klosterman and A. L. Moxon

RECENT advances in the use of protein supplements enable most farmers to avoid losses in feeding beef steers when hay quality is poor. However, there is always room for boosting the margin of profit by lowering the feed cost, especially when the differential between cost and selling price per hundred weight is low.

A project recently concluded at the Ohio experiment station shows that, while there is no substitute for good hay, growers can effectively use poor hay and yet market high quality steers at a fair net profit.

Basically, the system calls for full feeding of corn and cob meal plus soybean oil meal, cod liver oil, minerals, salt and all the poor hay the cattle will eat. Highest gains, of course, resulted from feeding good hay. Here, the same ration topped all other systems and showed a lower feed cost per pound of gain, and a higher average finished grade on foot.

Steers used in the experiment were purchased in Kansas City. Upon arrival at Wooster, they were divided into seven lots of 13 or 14 steers each and kept on poor quality hay until the start of the project. Average weight was 475 pounds. The dry lot system of feeding ran from November 13 to June 24, or a total of 224 days.

Nonvariables in the ration averaged two to three pounds of hay, 11 to 12 pounds of corn and cob meal, 1.3 ounces minerals, and from one-half to three-fourths ounce of salt per steer per day. Cod liver oil was fed to all lots to insure an adequate intake of vitamins A and D.

Five of the lots received a daily ration of poor hay plus the other nonvariables; the remaining two lots ate good hay in addition to nonvariables. Variables were as follows: Lot No. 1, 1.5 pounds of soybean oil meal; No. 2, 1.5 pounds of soybean oil meal and

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Wooster, Ohio

one pound of molasses; lot No. 3, the same amount of molasses ash; lot No. 4, .75 pound soybean oil meal and .12 pound urea; and the last lot, 1.5 pounds of soybean oil meal plus .07 pound trace minerals.

Of these five lots, the steers in lots 2, 3 and 5, fed molasses, molasses ash, and trace minerals, respectively, gained at approximately the same rate (2.02 to 2.06 pounds per head daily). The feed cost per hundred weight of gain was the highest for the molasses fed cattle, which was followed closely by those fed trace minerals. Steers in these two lots graded slightly higher than did those fed the molasses ash.

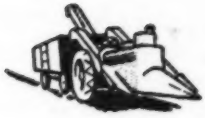
Poorest results were noted in lot No. 1, both from the standpoint of daily gains and live grades. The fact that the feed cost here was lowest indicates that additional supplements, while they may appear to add unnecessary cost to the ration, do pay off in the end. The steers in lot 4, which were fed urea, gained and graded much the same as those in lot No. 1.

Between the two lots fed good hay, the one receiving soybean oil meal at the rate of 1.5 pounds daily, plus the other nonvariables, had a lower feed cost per pound of gain and showed a higher live market grade than the one receiving less soybean oil meal and .12 of urea. On the hoof grading of this first lot resulted in nine prime and five choice steers, while the other ran three prime, seven choice and three good.

Conclusions from this experiment indicate that when good hay is available for dry lot feeding, there is nothing comparable to it for satisfactory, low cost gains in feeding steers. In fact, growers would be wise to make the fullest use of such feed rather than selling it out at a high market price. To put it simply, choice hay is more valuable when converted to pounds of beef than as a cash crop, except where other conditions cause livestock feeding to be unprofitable.

Poor hay, on the other hand, can be utilized following seasons of unfavorable weather when the crop is over mature or damaged by rain. Improved supplements will spell the difference between little or no profit from the venture and a fair margin of return.

Giving cows a rest period of 60 to 90 days after each calf will lessen trouble with sterility, abortion and weakness in their calves, says a University of Illinois veterinarian.



How Efficient Is Your Corn Harvest?

Picker losses and storage damage can take a big cut out of your corn crop. Here's how to avoid excessive loss.

Condensed From Nebraska Experiment Station Quarterly

L. W. Hurlbut

Chairman, Department of Agricultural Engineering
University of Nebraska

IT'S OUR guess that when you harvested corn this year you left about 10 per cent of the crop in the field. Another five per cent probably will be lost or badly damaged in storage. There is a good chance that you won't do even this well.

Is this an efficient corn harvest with modern machinery?

Not exactly, but tests at the Nebraska experiment station show that the grain from only about 85 out of every 100 ears gets to market when modern harvesting equipment and modern storage practices are used.

The size of this loss is even more startling when it is considered on a state-wide basis. About 25 million bushels of corn will be left in Nebraska fields after the harvest of this year's predicted bumper crop of about 248 million bushels. Another 12 million bushels is likely to be badly damaged in storage. This adds up to a handsome annual reward for the development of better harvesting machines and better harvesting and storage practices. This is why experiment station's agricultural engineers are busy on research that promises to improve the over-all efficiency of the corn harvest.

Harvesting and storage investigations indicate that corn losses can be reduced considerably by selecting the correct harvesting machine, by properly adjusting the machine and planning a timely harvest, and by the use of better storage practices and equipment. You can be sure that time spent on a careful analysis of your

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harvesting operations and your storage methods will yield good dividends. The factors to be considered include ears dropped before harvest, probable wind damage, stalks weakened by disease or insects, shelled corn on the ground, too much shelled corn appearing in the wagon among the ears, and too many husks on the ears.

Field Losses

First, let's consider what can be done about the field losses. The answer seems to be closely linked with the time of harvest. Experiments clearly show that when harvesting is started early, field losses are much lower than when harvesting is started late. A normal machine loss of about four per cent can be expected at the earliest time that corn is safe for cribbing, or when kernel moisture is about 20 per cent. As the corn dries beyond this point the normal loss increases about three per cent per week for a period of about four weeks, or until the cobs become dry (table 1). Damage from windstorms and insects also becomes increasingly important as the season progresses. Table 2 shows how losses for early and late harvests compared in 1950 and 1951.

Nebraska Research Bulletin 166 shows the typical moisture percentages of corn kernels and cobs at various stages of maturity. These data suggest the possibility of harvesting ear corn at 25, 30 or even 35 per cent kernel moisture if adequate provision is made for drying it. If drying facilities are available the date for starting harvest may be advanced 10 to 15 days.

Nebraska Experiment Station Bulletin 394 entitled "Factors Affecting the Efficiency of the Mechanical Corn Picker" offers another suggestion. It suggests the possibility of adjusting the planting schedule to conform more nearly to the harvesting schedule, since lower machine losses are closely related to an early harvest. It also reports that the corn picker operates most efficiently when the moisture content of the kernel is 20 per cent or higher. This means that present day mechanical corn pickers do their best work at a time when the corn cannot be stored safely with existing storage practices. This suggests that you should consider what forced air drying equipment can do to improve the efficiency of your corn harvest.

Estimating Losses

Field losses can be estimated quickly and easily. Each medium sized ear (8 ounces when air-dried) in 88 feet of 42 inch row, or 93 feet of 40 inch row, represents one bushel per acre. For shelled corn, each 1.5 kernels per square foot represents one bushel per acre. It is most practical to make a shelled corn count across

the full width of the row and three feet along the row. Then 16 kernels represent about one bushel per acre. These small area checks should be repeated several times throughout the area harvested.

Storage Problems

The storage operation deserves some consideration, too. Husks and shelled corn carried into the crib slow down natural drying because they fill the space between the ears and retard the natural circulation of air. Forced-air circulation may help some where there is an excess of shelled corn and husks in the crib, but it is most effective in a crib of clean ears nearly free of shelled corn. The shelled corn can be easily separated from the ears at the crib by the use of special grates built into or attached to the corn elevator.

Husk "ribbons" present a different problem. They must be separated from the ear in the field by the harvesting machine. Ears can be cleanly husked only with a machine properly designed, properly equipped and carefully adjusted for the job to be done. There is a big difference in the amount of husks left by different combinations of equipment used for snapping and husking corn. It is important to select a machine that will do a good job of husking if the storage period is to extend

Table 1—Expected total field loss (per cent) of corn harvested under favorable conditions in relation to moisture content of the kernels and cobs.

	Days after maturity						
Crop characteristics	Mature	10	20	27	34	41	49
Kernel moisture	34	26	20*	17.5	16	15	15
Cob moisture	54	46	30	24	21	19	17
Expected crop loss	1	2	4	7	10	13	15

* Normal harvest starts at a kernel moisture of 20 per cent.

Table 2—Corn harvesting data recorded in experimental tests with a two-row mounted picker-husker on the Agricultural Engineering Farm near Lincoln, Neb.

Date	Moisture, % Kernel	Moisture, % Cob	Stalks broken over, %	Picker loss, % Shell'd corn	Picker loss, % Ears missed	Ears dropped before picking, %	Total corn loss, %
Oct. 28, '50	25.2	51.4	6.0	1.68	1.02	.64	3.34
Nov. 6, '50	21.9	35.6	12.4	2.63	1.70	1.30	5.63
Nov. 27, '50	18.8	25.5	42.7	3.80	3.90	2.50	10.20
Oct. 15, '51	27.5	55.3	1.1	1.30	.70	.40	2.40
Nov. 2, '51	24.2	52.5	1.2	1.50	.80	.80	3.10
Nov. 19, '51	19.7	38.8	5.9	2.40	1.30	5.40	9.10

into the summer.

Harvesting experiments in which husk "ribbons" were removed and measured by weight showed that there is a difference in corn varieties. Some varieties retained two or three times as many husks as others. The same tests showed that loss of shelled corn in the field is much more closely related to moisture content of the cob and kernels than it is to the variety grown.

What About the Future?

Are you wondering what new developments the future may bring?

We think the efficiency of harvest labor can be increased by field-shelling corn with relatively high moisture, say 25 to 30 per cent, so that the cob can be left in the field. Then the high moisture shelled corn can be dried with forced heated air before it is put in the bin. If the shelled corn contains no more than 25 per cent moisture it can be placed directly in the bin and then dried with forced unheated air.

It may be practical to modify a combine so that it will snap and field-shell corn efficiently. Experimental work is already under way on this problem.

Rotenone Rids Cattle of Grub Menace

Your dairy cows and beef cattle will do better if they're not bothered with cattle grubs this winter and with heel flies next summer. That's the reminder of Dr. N. D. Levine, Illinois animal parasite specialist. For best results he suggests treating cattle with rotenone once a month from late December through April.

Grubs can make cattle mighty uncomfortable during the winter, as they bore through the flesh of the cow's back and irritate the hide, Dr. Levine says. And in the summer, as heel flies, they frighten the cattle, causing them to run wildly around the pasture.

If you have a small herd, a good treatment is to dust each animal's back with a one and a half per cent rotenone powder and rub it in. Or, if the herd is large, run the cattle one at a time through a runway, and use a high pressure spray with seven and a half pounds of five per cent rotenone powder in 100 gallons of water.

Dr. Levine says rotenone is relatively inexpensive. The benefits derived from using it will more than compensate for its cost and the time spent in treating the cattle. — *University of Illinois*

Bromegrass, timothy and lespedeza seed will be hardest to get next spring, says an Illinois agronomist.

Wintering Beef Calves

Feeding Trials Will Help You Decide on Supplements to Add to Low-Value Roughages

Condensed From Nebraska Experiment Station Quarterly

William J. Loeffel

Chairman, Department of Animal Husbandry
University of Nebraska

YOU can use bulky, low-value feeds to good advantage to winter calves if these feeds are properly supplemented. This is being demonstrated by feeding trials at the Nebraska experiment station. The high price of feeder calves has aroused much interest in lowering costs by growing the calves for a time on less expensive or even unsalable roughages.

The feeder who wants to summer-feed either on grass or in dry lot generally finds it advantageous to buy calves in the fall and winter them. He usually can obtain better quality feeders in the fall than in the spring. The farmer with plenty of roughage may buy calves in the wall, winter them well and sell them in the spring. Feeder cattle prices are generally at a low point in the fall. In the spring they reach a seasonal high.

The wintering operation followed by grazing and fattening stabilizes beef production and makes it more a productive than a speculative undertaking.

Many different types of rations may be used for wintering. They are made up chiefly of roughage such as hay, ensilage or fodder.

Wintering cattle should grow at a reasonable rate. Without gains there is no chance to cheapen the first cost. However, where cattle are to be grazed, they should not be wintered so liberally that they become too fat to make efficient gains on pasture. Large winter gains usually result in small gains on grass the following summer.

Prairie Hay Alone

Probably the most common calf wintering ration is prairie hay. It may be used as a basis for judging other rations. Fourteen lots of calves averaging 438 pounds were fed nothing but prairie hay for 151 days. The average daily gain was 0.09 pound. Nine of the lots gained from 0.12 to 0.40 pound per day, and five of the lots lost

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from 0.07 to 0.31 pound per day. For each 100 pounds of gain or loss, 7,210 pounds of prairie hay was required.

Prairie hay varies widely in quality and feeding value. Hay cut in July which contained 6.76 per cent protein was very palatable and calves that received it gained 0.29 pound daily. Hay cut in August which contained 5.45 per cent protein was less palatable and calves gained 0.10 pound daily. Similar hay cut in September which contained only 4.30 per cent protein was relatively unpalatable. Calves rejected considerable quantities of it and actually lost 0.18 pound per day on it.

Oilseed Meal With Prairie Hay

With prairie hay alone, gains are slow and inefficient because the ration lacks protein. To overcome this deficiency an oilseed meal like cottonseed, linseed or soybean meal may be fed with the hay. Oilseed meal was fed to 36 lots of calves at rates of one-half, three-fourths, one and one and a half pounds per head daily. With one-half pound, the average daily gain was 0.61 pound. To produce 100 pounds of gain, 2,434 pounds of hay and 101 pounds of oilseed meal were needed. Two lots received three-fourths pound of cake per day and gained 0.95 pound daily. Eighty-two pounds of cake and 1,403 pounds of hay were needed for 100 pounds of gain. The 22 lots that received one pound daily gained 0.94 pound per day. To produce 100 pounds of gain, 114 pounds of supplement and 1,373 pounds of hay were required. Where one and a half pounds was fed (one lot), the daily gain was 1.05 pounds. In producing 100 pounds of gain, 142 pounds of supplement and 1,120 pounds of hay were needed.

The final weight, the total gain per head and the average daily gain increased as the supplement was increased. The liberal feeding of cake saved more hay in producing 100 pounds of gain. Cottonseed meal contains not only considerable protein, but also phosphorus. However, if some phosphorus supplement such as bonemeal is fed with it, soybean meal is just as efficient as cottonseed meal.

Adding Grain to Prairie Hay

Two pounds of each of several common grains were fed per day with a full feed of prairie hay. Calves fed corn gained 0.52 pound per day—at an expenditure of 383 pounds of corn and 2,032 pounds of hay for 100 pounds gain. Corn proved to be the least effective of the grains used. Two pounds of ground rye produced an average daily gain of 0.75 pound at the rate of 267 pounds of rye and 1,448 pounds of hay per 100 pounds of gain. Oats and ground barley proved

the most efficient of the grains used, two pounds of either one per day producing as large gains as three-fourths pound of cottonseed meal per day. Two pounds of oats per day with prairie hay produced a daily gain of 0.90 pound, with 223 pounds of oats and 1,445 pounds of prairie hay needed per 100 pounds of gain. Barley fed in the same way produced a daily gain of 0.86 pound. Each 100 pounds of gain required 231 pounds of barley and 1,548 pounds of hay.

One pound of corn per day combined with one-half pound of cottonseed meal did not prove as efficient as three-fourths pound of cottonseed meal. On the other hand, one pound of either oats or ground rye along with one-half pound of cottonseed meal proved slightly superior to three-fourths pound of cottonseed meal.

Mixed Clover Hay

Calves fed prairie hay gained 0.037 pound per day while those fed mixed clover hay gained 0.74 pound. To produce 100 pounds of gain, 2,433 pounds of prairie hay or 1,704 pounds of mixed clover hay were needed.

Alfalfa Hay

In a 133 day trial calves fed alfalfa hay as their sole ration gained 0.70 pounds per day and required 1,712 pounds of hay to make 100 pounds of gain. However, the feeding of a small daily allowance of grain (2.98 to 5.70 pounds) increased the daily gain to 1.60 pounds. In six trials ground corn was fed, and in three trials ground grain sorghum was fed. To produce 100 pounds of gain, 249 pounds of grain and 681 pounds of hay were required. Thus the feeding of the grain increased the gains and effected a substantial saving of hay.

Alfalfa Hay vs. Silage

In five trials alfalfa hay was compared with silage. A light feed of grain (4 to 5.7 pounds per day) plus a pound of cottonseed meal was fed in all lots. The hay fed lots averaged 1.70 pounds gain per day and the silage fed lots 1.90 pounds. To produce 100 pounds of gain, 288 pounds of grain and 632 pounds of alfalfa hay were required. To make the same gain, 258 pounds of silage and 51 pounds of cottonseed meal were needed.

Silage vs. Fodder

In three trials corn silage was compared with ground fodder. In each case, some alfalfa hay was fed. The gains were almost identical, 1.56 pounds per day for silage and 1.54 pounds for ground corn fodder. To produce 100 pounds of gain, 2,081 pounds of silage and 154 pounds of alfalfa hay were required as compared with 916 pounds of fodder plus 155 pounds of alfalfa hay. An acre of corn fed as silage produced 37 pounds more gain than where it was fed as ground corn

fodder.

Better results were secured with corn silage where it was supplemented with cottonseed meal (1.80 pounds gain per day as compared with 1.69 pounds). The reverse was true where alfalfa hay was fed (1.54 pounds per day gain for fodder as compared with 1.45 pounds for silage).

Several different varieties of sorghum were compared as fodder and silage. In each case some grain and a protein supplement were fed. Here again silage proved superior to chopped fodder.

Sorghum vs. Corn Silage

Fed with alfalfa hay or cottonseed cake, corn silage proved superior to silage made from Atlas sorgo. The average daily gain of calves fed corn silage and alfalfa hay was 1.34 pounds as compared with 1.19 pounds for similar calves fed Atlas sorgo silage and alfalfa hay. Although corn silage proved superior to corn fodder, it should be pointed out that the 10 year average yield of corn silage at Lincoln was 3.38 tons per acre while the yield of Atlas sorgo silage was 7.39 tons. Thus more feed was produced per acre from sorghum than from corn.

Cottonseed Meal and Limestone

Calves fed silage, one pound of cottonseed meal and a tenth of a pound of ground limestone gained 1.40 pounds per day. When the cottonseed allowance was raised to two pounds per day, the daily gain was increased to 1.72 pounds and the cattle proved too fleshy for feeders. A small daily allowance of ground limestone for calves being wintered on a silage and cottonseed ration resulted in slight increases in silage consumption, daily gain and efficient gains. It also improved the attractiveness of the calves.

Urea

In several tests urea was substituted for part of the protein in wintering calf rations. Satisfactory gains were obtained. Urea proved of value as a protein substitute for wintering calves, but its value was not as great as for fattening animals.

Prices paid by farmers for goods are increasing, yet the prices they receive for their products is decreasing. Consequently, according to the bureau of agricultural economics in Washington, the parity ratio is going down and farmers are feeling the pressure.

Best "self-setting mouse trap" available to the farmer is an owl. Contrary to belief of some hunters and farmers, owls are not serious threats to small game and poultry, but they are always on the look-out for mice, says C. M. Kirkpatrick, Purdue University.

Behold!

THE LYCHEE

A Fabulous Future is Predicted for This Ancient Oriental Fruit Now Paying Up to $18,000 Per Acre

Condensed From American Fruit Grower

Eldon S. Banta

FLORIDA has a new and exciting industry just beginning its development, the growing of the ancient oriental Lychee fruit *(Litchi chinensis)*. A subtropical evergreen tree produces one of the finest flavored of fruits. Volumes could be written about the Lychee and the part it has played in Chinese living for centuries, as well as the part it has played in oriental lore.

The tree is long lived. The two oldest trees still growing in Hinghwa district of Fukein province of China are said to be 1,200 years old. The largest one measures five feet, 10½ inches in diameter, and reaches up to 75 feet.

The first Lychee trees now living in Florida were shipped from China between 1903 and 1906 by W. N. Brewster, then a missionary in China. Fortunately, the trees were of one of the best varieties in China. In America it has become known as the Brewster variety.

Col. William R. Grove was the spirit behind the Florida Lychee industry. At his own place near Laurel the colonel for many years experimented with various subtropical fruits in an effort to find one or more which could be developed commercially. The present high interest in the Lychee is the result of his experiments, trials and enthusiasm. In his Lychee Orchards, Inc., Col. Grove was the first to establish commercial planting in Florida.

Where does the Lychee grow best? California seems to be out because the climate is too dry. In Florida it seems to thrive throughout the citrus belt, its soil and climatic requirements being similar to citrus.

Specifically, a section of the Ridge district extending from Haines City to Lake Placid pre-

Reprinted by permission from American Fruit Grower
Cleveland, Ohio

sents one of the finest sites for Lychee plantings. There are a few scattered trees in this area which have been growing and fruiting for about 25 years.

A drawback to immediate extensive plantings of the Lychee is the fact that most of the suitable soil is now planted in citrus. The future may prove other soils and locations in Florida to be as well adapted to Lychee growing as the present areas.

Land is cleared and worked much in the same manner as in preparation for planting citrus trees. Trees are set any time of the year. Planting distance is 40 feet on the square with a tree set in the center between each row. This requires about 50 trees per acre.

Experience thus far indicates that Lychee trees require about the same fertilizer treatments as do citrus. The trees are fertilized three or four times a year at about the time they make a flush in growth. Very young trees receive a small handful of fertilizer per tree and older ones receive their dosage according to age and spread of tree as well as soil condition. As a general rule a large tree will receive a pound of fertilizer for each foot of spread of branches. Thus a tree with a 20 foot spread receives 20 pounds of fertilizer at each application, or 60 to 80 pounds a year.

Analyses of fertilizer varies with the season. In summer months a 4-7-5 is used to produce rapid growth. In the fall 4-8-8 is used because it is high in potash which helps to harden the new growth for the winter months.

So far in this country no disease affects the Lychee and no spraying is done. No pruning or thinning of fruits is necessary, either.

Propagation of the Lychee tree is very interesting. In the orient the method of propagation is known as "gootee." Here we call it "air layering."

Air layering is just what the term implies, layering the aerial limbs on the tree. Instead of bending limbs to the ground, as is done with many plants, soil or other rooting media is taken up to and secured around a limb. The procedure is first to remove a ring of bark and cambium layer from the branch just below a leaf node. The width of the ring is about one and a half times the diameter of the branch. Branches up to four inches in diameter can be used and as many put on a tree as can be conveniently worked. It is not uncommon to find 200 or 300 air layers on a large tree.

A ball of wet sphagnum moss, dirt or other rooting media is applied evenly around the cut surface and held in place with string or other means. The newest and best method is to use the "Airwrap" process. This consists of wrapping the ball of rooting me-

dia with a flexible synthetic plastic which holds moisture but permits the exchange of gases. This eliminates the necessity of frequent watering of the air layers.

Within three or four weeks after layering, roots can be seen. In about six weeks rooting is sufficient to permit severing the branch from the plant just below the layer. The plastic covering is carefully removed so as not to injure the roots and the new plant set in a pot or can of good soil. About half the leaves are trimmed off to keep balance between tops and roots.

The newly potted Lychee trees are first set in shade for six weeks, at the end of which they are moved to partial shade for six more weeks. Then the little tree is ready for orchard planting. Thus it takes between three and four months from time layering begins until a new tree is ready for planting, a rather short time for propagating horticultural plants.

Layering Done in Early Summer

Mr. and Mrs. Walter J. Summers are in charge of the Lychee propagation program at Lychee Orchards, Inc., and so have propagated most of the trees now planted in Florida. They do the bulk of the layering in early summer, utilizing high school students for assistants. Last summer they put in some 20,000 layers. They have rooted more than 90 per cent successfully.

In Florida the Lychee tree blooms in the latter part of February and harvest is between June 20 and July 10. Once ripe, Lychees will remain on the tree for about two weeks. Under refrigeration the fruit will keep its rich red color for about three weeks. The use of Pliofilm to hold the fruit has added two to three weeks more to the marketing season.

Qualities of Lychee Fruit

The mature fruit is of a bright strawberry red color and measures about one and a quarter inches in diameter. The outer layer (pericarp) of the fruit is tough, sometimes brittle and not edible. This is easily broken and just inside lies the firm, white, juicy pulp, the edible part of the fruit. Inside this is a single small seed that easily separates from the pulp. The pulp is very sweet, slightly subacid, and possesses a flavor that some have likened to a Bigarreau cherry or to a Muscat grape.

A four year old tree may produce two or three pounds of fruit and will increase its yield each year until it may yield over 400 pounds in later years. One 12 year old tree at Lychee Orchards, Inc., last year yielded 308 pounds, practically all salable fruit.

The extremely high returns per acre make Lychee orchards attractive investments. The price of Lychee fruits sold at Lychee Or-

chards, Inc., and other orchards in Florida ranges from $1.25 per pound wholesale to $3 per pound retail. With 50 trees per acre and a yield of 300 pounds per tree, a 12 to 15 year old orchard will yield 15,000 pounds per acre. At the above prices you can readily see why interest is mounting in planting Lychees.

Because of present supply and price, Lychees are strictly luxury fruits, being sold to the Chinese people of this country, to exclusive restaurant and hotel trade, and through "fruit-of-the-month" clubs. The future promiese a greatly expanded market, especially if the price of the fruit lowers somewhat with increased production.

Cost for an Acre Planting

Even at much lower prices for the fruit, Lychee growing will remain a highly profitable business in Florida. At present prices and wages, it takes about $300 to buy and clear an acre of suitable land for Lychee planting. On a 10 acre basis, another $300 will cover the cost for an acre of trees, planting, a well for irrigation, and other expenses the first year. Following this, annual cost of orchard care will run in the neighborhood of $150 per acre for the next three years until the trees begin to bear. Thus the total cost of bringing an orchard into bearing age will run around $1,000 to $1,100 per acre.

The price of fresh Lychees will invariably fall somewhat after production reaches large commercial proportions. However, there is very little likelihood that prices will fall to ruinously low levels for several reasons. The Lychee is one of the world's finest fruits and almost universally liked. Demand should remain high. The suitable area for production in this country, and in the world for that matter, is very limited so overproduction seems improbable. The fruit makes delicious frozen, canned, preserved, spiced, dried and fermented products which haven't even been tried in this country. Indications are that this business will develop very rapidly in Florida. But the fresh fruit will always remain a delicacy.

Association Being Formed

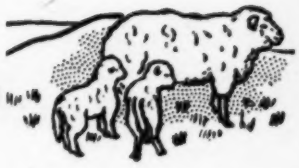
Florida Lychee growers are in the process of forming the Lychee Growers' Association. This is a marketing organization designed to aid and protect the young industry.

From all indications the Florida Lychee industry is getting off to a good sound beginning under able guidance and leadership.

First 100 eggs a hen lays just about pay for her feed for the year, according to Michigan State college poultry specialists.

Farm labor and fertilizer costs lead the list of items that probably will increase farming costs in 1953.

How John Young Makes Money on Sheep



Condensed From Successful Farming

Dick Hanson

FARM managers and farm advisers have been bearing down on the idea of making sheep a side-line business on a great many farms in the past few years. And, on some farms, this is a good idea. Sheep work well as an addition to other types of livestock farming. But sheep need not be a side line. They can hold their own incomewise if you know how to handle them.

Sheep are anything but a side line on John Young's farm near Centralia, Kansas. They're his only business. Five hundred ewes and their lambs, plus two or three carloads of feeder lambs, are anything but a side line.

John's 500 ewes are bred to Hampshire and Suffolk rams about the first of September. Lambs begin arriving by February 1. The ewes are fed one-half pound of shelled corn per head per day during the breeding season. Also, during this period, the ewes graze on lespedeza and brome pasture. When the grass thins out in the fall, ground ear corn is fed in bunks once a day. The ewes also are given hay on the pasture.

John lets the ewes tell him when they aren't getting enough to eat on pasture. When they appear empty and caved-in in the morning when turned out to pasture, he starts feeding grain.

There are a number of reasons why John Young is successful at raising sheep. Probably the biggest reason is his management system at lambing time. Everything moves like clockwork.

At lambing time, the ewes are separated into three holding pens of not more than 200 to a pen. The ewes are kept in these holding pens near the sheepshed and are checked every three hours night and day. As soon as a lamb is dropped, the ewe and her lamb or lambs are taken into one of the maternity pens inside the sheepshed. These pens are warmed by heat lamps installed under a shield in one corner of the pen.

Each morning, the ewes and

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Des Moines, Iowa

lambs of the previous day's drop are numbered with branding paint for identification. Each pair has a different number. The ewe is numbered on her back. Twin lambs are branded on the right side, single lambs on the left.

John's sheepshed used to be a cow barn. One room, below the main floor, is kept warm with an oil heater. If a lamb has become chilled, the lamb and ewe are kept in this room for a short time. Then they are moved upstairs to the regular maternity pens.

The most difficult—and probably the most important—job is teaching the ewe to keep track of her own lamb or lambs. And this sheep raiser makes sure lambs are not neglected by their mothers.

After lambing, the ewe and her lamb are kept in the maternity pen the first day. The second day, the ewe and lamb are put in a pen with four other ewes and their lambs. Three days after lambing, about 100 ewes and their lambs are thrown together in one pen.

At the end of three days, most of the ewes can keep track of their own lambs. If not, they go back and begin the three day learning session over again.

If a ewe has twins, she is handled differently. The ewe is kept in a single pen with her lambs for two days instead of one. After two days, she is put in a pen with another ewe and her twins and is kept here three days. The twins are then collected together in groups of not over 25 ewes and 50 lambs for five days. Then they are transferred to a group of 100 ewes and 200 lambs. In about three weeks the ewe and her twin lambs are transferred to the regular flock.

John lost a good many lambs before he started his "training" course. "I had lambs starve to death simply because the ewes couldn't find them," he said.

In any sheep raising system as large as this one, there are bound to be some orphan lambs. These orphan lambs are kept in a special pen and are bottle fed. Milk from ewes that have more than enough for their own lambs is fed to the orphans. Dead lambs are skinned immediately and the skin is put on one of the orphans. A ewe usually will accept the orphan as her own lamb and will nurse it.

This "orphan pen" system largely eliminates the dry ewes. An orphan over a week old is too old for adoption and is either given away or raised on cow's milk.

This system of handling lambs has kept the death rate very low in the Young flock. Since each ewe is matched with her lambs by the brand number, it is easy to find a lamb that's starving.

Lambs are allowed to run with the ewes at all times. As soon as

they are old enough to eat, they are self-fed shelled corn.

Many sheepmen won't go along with the method John uses to feed his lambs. The lambs are self-fed. They can eat all they want at any time. Two large self-feeders are kept full of shelled corn all the time.

The lambs eat from the self-feeders round the clock. One of the feeders is lighted so that the lambs can eat during the night. And they make good use of the night hours. According to John, he has to fill the lighted feeder twice as often as the unlighted one. There are always lambs around the lighted feeder, regardless of the hour.

The lambs eat about two and a half pounds of shelled corn per head per day. This is about three-fourths of a pound more than the lambs ate when John used to hand feed them. Since he has been using the self-feeders, the lambs are ready for market about 30 days sooner than when hand fed.

The losses from overeating under this self-feeding system are very low. About 1.5 per cent is the usual loss. The low death rate is the result of careful feeding. A commercial supplement is mixed and fed with the corn. One hundred pounds of the supplement is mixed with each 33 bushels of shelled corn. The supplement contains proteins, vitamins and minerals.

Purchased feeder lambs are handled just like the home grown lambs. However, the purchased lambs are worked up to a ration of one and three-fourths pounds of corn per day before they are allowed to go to the self-feeders. The one and three-fourths pounds of corn is hand fed in bunks.

When John sells his lambs, there's no doubt about the effectiveness of his system of raising them. He gets top prices. The lambs have been dressing out better than 51 per cent. And that percentage is for the entire flock, not just the top lambs.

June 15 is usually the date when the largest lambs are sold. Those that aren't sold at that time are weaned a month later and fed out on self-feeders until about September 1. At this date, the lambs usually weigh about 90 pounds.

Taking good care of the ewes is also important on this farm. Drenching for worms three times a year, feeding phenothiazine in salt, and spraying for insect control help keep the ewes in good condition. The feeder lambs which are bought are wormed as soon as they arrive at the farm.

Wool from the ewes adds a good bit to the income from the flock. The ewes are grain fed during the winter as needed, but John figures the wool largely pays for the grain. And the good con-

dition of the ewes at lambing time is enough to convince this sheepman that grain feeding pays. The ewes are sheared in April before hot weather sets in.

It takes a good deal of feed to handle 500 ewes, their lambs, and the purchased feeders. John has 320 acres of what used to be considered "not so good" land. The land cost $50 an acre in 1944. Eighty acres of the farm are in alfalfa, 50 acres in red clover and Ladino, and the rest in brome and lespedeza. About 3,000 bushels of corn are bought every year.

John sums up his sheep program by saying, "In my opinion, you shouldn't have anything permanent for the raising of sheep except the four outside walls of the buildings and your boundary fences. You've got to change things often to suit the sheep."

Egg Producers Face More Favorable Future

"Generally more favorable" is the outlook for egg producers, as seen by Dr. R. C. Krueger, Virginia agricultural economist. He predicts demand for eggs will be somewhat stronger during the coming year. A reduced supply is in the picture, and feed costs are not expected to increase. "Composite result of these factors should make 1953 a slightly more favorable year than the relatively poor year of 1952," he concludes.

A less than normal difference, however, is expected in the price of eggs between the first and last half of 1953. Defense spending, investment spending, and consumer incomes are likely to level off or even decrease during the latter part of 1953. This in turn may cause some reduction in demand. Higher egg prices next spring may lead to an increase in the number of chickens farmers raise and ultimately an increase in the supply of eggs during the fall and winter of 1953. Therefore, there likely will not be as great an increase in the price of eggs between the first and last half of 1953 as usually takes place between these two seasons.

Broiler prices will probably average slightly lower in 1953 than during the first 10 months of 1952. However, Dr. Krueger points out that wide variations which occur in broiler prices from week to week and month to month make the value of an estimated average annual price to producers doubtful. Few producers sell birds more often than four times a year. Consequently the price on the day they sell has more influence on their income than the average annual price.

— *Virginia Polytechnic Institute*

FFA and 4-H Members Grow Seedling Trees

Condensed From Soil Conservation

Earl E. Fenton

IN A NOVEL experiment to overcome the scarcity of seeding trees for planting stock, the directors of the Barry soil conservation district in southeast Michigan think they have found the solution in small individual seedbeds. And since the trees are produced as Future Farmers and 4-H club projects, the added dividend from teaching tree lore to the district's school children may be worth even more than the rough hills and sandy plains that are being reforested.

From the beginning of the district, the directors have recognized the need for planting trees. Nearly every farm has an area on which good land use is a matter of reforestation. The usual forestry demonstrations such as planting, Christmas tree pruning and disease control were utilized. Planting stock was furnished on a 50-50 matching basis, and a tree planting machine was made available. But encouraging as were the results, district directors were anxious to get the trees planted faster.

The individual seedbed project was started in 1950, after the difficulty of securing planting stock had extended over several years. The Hastings Kiwanis club and the Michigan State Soil Conservation Committee helped finance the project. The program began with demonstrations for the pupils on seedbed site selection, soil preparation and seeding and care of the beds. Seed and materials for constructing the beds were provided by the district.

During the spring of 1950, 40 seedbeds were established—38 by FFA members and two by 4-H clubs. The following year 100 new beds were established. The

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Washington, D. C.

beds are about three by five feet and will average 2,000 seedlings per bed. This project, with increased participation by FFA students, 4-H club members, and others, was again carried out in 1952. Several hundred thousand seedlings from the beds increased the planting stock needed in the district's reforestation program.

Although the Barry soil conservation district junior forestry program is supplying a planting stock needed now, it is equally a project for the future. Reforestation in the district is a big job that can't be done in one generation. The junior forestry program is training the generation that will soon have to take over.

To win the grade of junior forester a student must complete a specified course of study. This course includes the writing of essays, identification of trees, field trips and group discussions. Every junior forester must plant 10 trees supplied by the district.

During the 1951 - '52 school year, 67 rural school children and 29 Nashville fifth grade students completed the course and were presented badges by the district. Teachers and students in other schools are asking for help in adopting the program and an advanced course is being planned.

Roughage Feeding Cuts Calf Costs

Farmers can cut the cost of raising dairy herd replacements or dairy-beef cattle if they adopt a high-roughage system of feeding calves, says John W. Hibbs of Ohio agricultural experiment station. His plan combines limited milk feeding, a simple grain mixture, large amounts of good roughage and rumen inoculations. The latter is done with cud material from older cattle and helps to develop early rumen or paunch function in calves.

Experimental groups of Holstein heifers raised on this system reached or exceeded average weight for the breed—350 pounds at 6 months of age. Feed cost averaged about 15 cents per pound of gain for the six month period. Jerseys made similar gains based on their breed standards.

Fourteen Holsteins, started on the high roughage system, calved at 27 months of age with an average weight of 1,202 pounds. Sixteen Jerseys freshened at 28 months and weighed an average of 817 pounds at calving. Such weights are equal to normal breed averages.

— Ohio Extension Service

Loose Housing Means Less Labor

But It Takes Careful Planning to Avoid Disappointment

Condensed From Iowa Farm Science

S. S. De Forest

LOOSE housing — a dairy barn without stanchions—can cut your dairy chores to the minimum. But it takes careful planning and figuring to use loose housing successfully.

The loose housing system is a relatively new development for dairy farming. If the job is done right, the loose housing system can result in a more profitable dairying operation at a substantial saving in labor and time. However, if the job is done carelessly or hurriedly, it can be costly with little benefit. Most disappointment with the loose housing system can be traced directly to improper designing.

Briefly, here are the general advantages of the loose housing system with milking parlor and elevated stalls:

It reduces the chance of udder injuries and diseases.

Cows are usually cleaner.

It takes less labor than with the stanchion-type barn.

The housing arrangement is flexible.

Extra bedding soaks up liquid manure, resulting in more nutrients being returned to the land.

Manure may be allowed to accumulate and be hauled to the field during favorable weather. (Power equipment may be used for loading and hauling.)

Sanitary standards are easier to maintain.

Udder conditions are easy to observe in elevated stalls.

Loose housing is easily managed and with some exceptions is a low-cost type of housing.

Cows that are "off feed" often can be picked out when they hesitate or refuse to enter the stalls.

Remember, it's careful planning and designing that assures these advantages. *Unless* you *do* plan the job carefully, you may find that all of these advantages

Reprinted from Iowa Farm Science
Ames, Iowa

just aren't there in actual practice.

Here are what might be considered as disadvantages of the loose housing system:

Cows don't show to advantage.

"Bossy" cows may prove troublesome.

Horns may have to be removed.

More bedding is needed than with the stanchion-type barn.

More area per cow is needed than with the stanchion-type barn.

The cost of changing over to a loose housing system may be quite minor considering the labor it's possible to save and the freedom from udder troubles which will result with proper management. With individual exceptions, conversion can be made simply and without a lot of elaborate and expensive equipment.

Many existing barns are suitable for conversion to the loose housing system. Some may be general purpose barns; others may be older stanchion-type barns.

Here are some reasons why it might be advantageous to convert an older barn to the loose housing system:

First: Many general purpose and stanchion-type barns originally provided space for horses. Perhaps this space can no longer be effectively used—or it may be used for makeshift calf pens or a milk room. By converting to the loose housing system, you may be able to use this space more effectively.

Second: The labor requirement is high in stanchion-type barns. Chore studies by agricultural engineers show one dairyman walked 11 miles each month in milking, 8 miles in feeding and 34 miles in cleaning a stanchion-type barn. And many of these trips involved carrying a heavy load.

Third: Gutters in stanchion-type barns are often placed so that the distance from the gutters to stanchions fits medium sized cows. The result: Large and small cows develop udder injuries when their udders lie on the cold, wet platform or in the gutter.

Fourth: In case you're considering a switch from selling cream to selling whole milk, you may have to do some "fixing up" anyway so that milking may be done under more sanitary conditions.

Fifth: Perhaps you're thinking of expanding your business for increased income and better utilization of roughage. If so, you may want an arrangement for more volume without requiring additional labor.

Remodeling old barns calls for realistic planning so as to cut necessary labor and walking to a minimum. Although you might remodel your stanchion-type system by installing labor saving equipment (barn cleaners, drink-

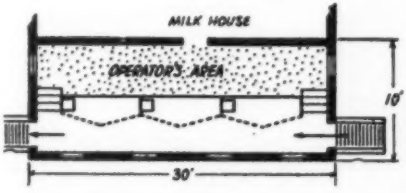
ing cups, feed handling equipment, etc.), you need to consider both the money you have for remodeling and the amount of labor you have available. Considering benefits in herd health and flexibility, you may be able to get the best volume from the loose housing system with a milk parlor and elevated stalls.

Type of Milk Parlor

Milking operations should be carried on with a minimum of stooping, carrying and walking. It's easy for a cow to carry the milk to the right place for milking. Why not let her mount a 30 inch platform so that milking can be done without stooping, carrying and extra walking on your part?

There are several good arrangements for elevated milking parlors or stalls.

In the *tandem* arrangement, several stalls are placed in a line with one cow behind the other.



The operator works at a lower level alongside. With the *offset tandem* system, stalls are at a slight angle. But again, the milker works at a level below and alongside the stalls. In both of these arrangements, cows enter stalls through gates in the back half of the stall and leave through gates in the front half.

Four cows stand abreast in the *Montana* system. The two outside cows stand about three feet from the center two cows; the milker's walkway is in between. The operator milks two cows from his first position between cows 1 and 2. But to milk the other two cows, he must walk in front of the center stalls and enter the walkway between cows 3 and 4. The main advantage of this arrangement is the small amount of space needed per cow for the stalls. However, the cows must back out of the stalls.

The *elevated U-shaped* parlor is another arrangement. Depending upon the number of cows and operators in the space available, from three to five stalls can be placed around the U. The operator's area is in the center where he can work between cows with a minimum of walking. Cows need not back out of the stalls, and the milk storage house can be close to the milking area. Space per cow is greater in the U-shaped parlor than in some of the other arrangements because of the long walkway around the stalls which permits cows to leave the parlor.

In the *walk-through* type of parlor, cows walk up elevated platforms on each side of the operator's level. This system uses the smallest space per cow. But it has the disadvantage of one slow milker being able to hold up milking operations since all cows on one side must move at the same time.

The type of milking parlor used should depend upon the barn itself and how it can best be remodeled.

First decide where the milk storage room should be. Perhaps it can be located within existing walls — or maybe you'll have to build a milk house as an addition. In either case, the milk room should be located next to the service court, preferably on the warm side of the barn. Additional bedded area, if needed, should be made to form an area sheltered from northwest winter winds. Such an arrangement usually leaves an area along either the south or east wall that can be used as a milking parlor. If the area is square, eliminate the long, narrow types of parlors as possibilities. Likewise if the area is rectangular, eliminate the square types for consideration.

After milk parlor possibilities are narrowed to two or three, the final decision should be based on convenience for the operator, personal preference and the ease with which cows may be gotten in and out of the stalls.

You may be able to convert space occupying horse stalls into calf pens, loafing area or even into the milk parlor. This depends upon the barn and its arrangement.

Water should be piped into the parlor for washing down floors and walls of the parlor. Feed can flow by gravity to the parlor from an overhead bin. Various gates and doors may be controlled from the operator's area by ropes and levers.

Milk Parlor Operation

Depending upon the type used, the milk parlor should operate about like this:

Feed is placed in each of the feed boxes, and the rear gate of each stall is opened by pulling ropes or levers — one for each stall. Another rope or lever slides open the door to the bedded area and cows enter the stalls. (The cows tend to line up outside the parlor door for their turn at the feed.)

As the milker units are removed from each cow, pull ropes or levers open the front gate of a stall, and the cow moves back out into the loafing area.

About 20 cows per hour can be milked with this system using two milker units. The number of cows milked may be even higher, depending upon the cows and amount of training.

Milk Parlor Problems

In planning a conversion, bear in mind that problems can develop. These are the "gimmicks" that can make a relatively simple job tough — and sometimes more expensive.

For example, low ceilings may make a 30 inch platform for the stalls impossible. Alternatives are to milk on the same level as the cows or to dig a pit for the operator. A pit is fine, but it may mean a drainage problem and call for more labor if you have to carry the milk up steps to the milk storage room. In this case, a parlor milker—although not absolutely necessary and an additional expense—might be used to take the milk into the storage room by pipeline.

Loafing Area

The loafing area has two parts —the feeding area and the bedded area. Space for these combined areas should be at least 75 to 100 square feet per cow. This should include 20 to 30 square feet per cow for use as calf pens.

Although there are many ways to arrange the feeding and bedded area, the important thing is that they be kept separate. Failure to make the separation or failure to locate the water so cows don't have to travel across the bedded area to go from hay to water, or vice versa, is responsible for many discouraging viewpoints of the loose housing system. It's almost impossible to keep a bedded area with cross-traffic clean unless unreasonable amounts of bedding are used.

A door located on the south or east side of the barn can be left open most of the winter. Only on especially stormy days will it need to be shut—and then only during cold, strong winds. Ventilation problems with the loose housing system are few since the door is usually open.

Feed mangers should be located so that manure will be concentrated in one locality. Pavement is desirable for this area so that manure can be quickly and easily hauled with a tractor loader. From the standpoint of labor requirement, the ideal arrangement for feeding hay is where cattle self-feed direct from the mow through a feeding fence or manger which can be moved back into the storage area as winter progresses.

Sometimes existing hay storage areas must be used in remodeled barns. If so, ample hay chutes should be provided to minimize walking needed for feeding hay.

An ideal location for silos is in the barnyard where silage is as near to the point of consumption as possible. Bunk sides may be used as rails for a silage cart. Or an overhead track might be used to distribute silage in the bunks. As the vehicle is moved along or above the bunk, the silage is raked

Bedding and Hay Requirements for Loose Stabling*

One Cow 1,000 Lb. Wt.	Bedding	Hay	
		. . . if hay is only roughage fed	. . . if both hay and silage are fed
Daily	12 lbs.	31 lbs.	19 lbs.
Season	2,520 lbs.	6,562 lbs.	3,937 lbs.
Storage	630 cu. ft.	1,458 cu. ft.	875 cu. ft.

* Figures revised from "Dairy Cattle Housing," Regional Bulletin 7.

out. Thus silage is lifted only once—when thrown down.

The bedded area is where the cows spend their time when not outside, or being fed or milked. A manure pack is allowed to build up in this area, and with ample bedding it provides a warm, clean place for the cows to lie. Allow three or four feet for manure and bedding to pile up. Foundations and piers should be high enough so that the wooden structure or posts will seldom be exposed to corrosive action of the manure. Ceiling height and doorways should be ample to maneuver a tractor and loader when hauling manure.

How Much Storage?

Loose stabling calls for about twice as much bedding as the stanchion system. This requires careful consideration of hay and bedding storage capacity. Sometimes it's necessary to reinforce the mow floor with I beams and additional floor joists. If you find a new addition is necessary, it can provide additional bedding storage overhead. The need for more bedding isn't a true disadvantage of the loose housing practice. Actually it's an advantage since the additional bedding absorbs liquid manure ordinarily lost—allowing more nutrients to be returned to the land.

The table above is a guide for determining hay and bedding requirements.

Labor Needed

Labor requirements for the loose housing system are low. Where studies indicated one dairyman walked 19 miles per month in milking and feeding before, his walking was cut to five miles after his conversion to the loose housing system with milk parlor. Since barn cleaning is done with tractor and power equipment, he saves the 34 miles of walking per month formerly needed to clean the barn manually.

Molasses at $2 per hundred is about equal to corn at $1.75 per bushel and can be used to make coarse roughage more palatable to cattle.

Why Joe Adda's Pasture Scored Excellent

New Jersey's Green Pasture Program Encourages the Growing of Better Pastures and Forage Crops

Condensed From New Jersey Farm and Garden

W. S. Meseroll, Jr.

MORE milk at lower cost, through a well rounded program of full season grazing and high quality roughage for winter feeding, was the goal set by Joseph Adda, jr., of Ringoes, New Jersey, when he started operations four years ago. This year Joe's grassland dairy farm was one of three Hunterdon County farms rated "Excellent" in the Green Pastures-Forage program conducted by the New Jersey extension service.

"His well planned program," says Rodney Briggs, associate specialist in farm crops at Rutgers, and a judge in the contest, "typifies the many 'Excellents' we judged this year." Joe's point score was 94 out of a possible 100.

Joe's herd was turned out on pasture in March, and remained on grass until Thanksgiving. During the winter they will have plenty of good "canned grass" to eat. A minimum amount of grain was fed during the summer—one pound of grain for each six pounds of milk produced. In winter, the ratio is five to one. When most dairymen experienced a midsummer milk slump from dry weather and short pastures, production from Joe's herd was on the increase. All this was possible because Joe developed a sound and efficient pasture-forage program.

According to Briggs, Joe has what it takes—a real philosophy of grassland farming. He gets the maximum out of grass. Let's take a look at Adda's program, and see why he scored "Excellent."

Joe put the mature animals of his 40 cow Holstein herd on balbo rye only a few hours a day at first, to receive a spring tonic. Joe says prolonged grazing of early rye is apt to put a bad flavor into milk. Next, the cows were rotated

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Sea Isle City, New Jersey

on 24 acres of permanent ladino-orchard pasture.

Incidentally, Joe uses his balbo rye as a nurse crop for his new legume seeding just as you might use wheat for new clover seedings. "When using balbo rye as a nurse crop you should not seed it too heavy," Joe cautions; "you get too much shade from dense growth and the young grass seedlings will be smothered out." He used a bushel and a half of rye to the acre, fertilizing at the same time with 500 pounds of 5-10-0. About 15 acres were seeded to balbo rye in 1952, seven by the third week in August, and the remainder by the first week in September. Next spring clovers and grasses will be sown in the rye, using it as a nurse crop.

The only time Joe uses a plow in preparing a seed bed is when ground is so hard that a weighted disc harrow cannot be used. He harrows when moisture conditions are best. "For example," Joe explains, "if it rains in the afternoon, and is clear the next morning, I get out the weighted disc harrow and go to work. For grass seeding, I think this is important. You can conserve moisture near the surface by not turning under all organic matter. It helps prevent run-off and provides a mulch for the new seeding." Since Adda runs his 132 acre farm without help, the weighted disc harrow method saves time.

Main pastures are seeded to a ladino-orchard mixture. Joe uses a basic mixture of one pound of ladino to six pounds of orchard grass. Some red clover is added when sown in the spring. Joe rotated his herd on these pastures until the middle of July this year. Then they were switched to eight acres of sudan and soybeans. This field lasted him until the third week in August.

Joe planted 20 pounds of sudan per acre and one bushel of soybeans per acre, fertilizing with 500 pounds of 0-20-20. "As a result of using this supplemental pasture," Joe says, "I was able to keep milk production up in midsummer. In fact, there was a slight increase."

In the fourth week of August the herd went back on the permanent pastures where they remained until put on late fall pasture (balbo rye). Joe makes a practice of leaving his cows on main pasture for only a week at a time. "I find that new growth is much more rapid then," he says. "I never let them graze pasture lower than three to four inches."

In mid-June Joe top dressed all ladino-orchard fields with 100 pounds per acre of "nu-green." "This may sound expensive," Joe tells you, "but I think it is the cheapest form of nitrogen available, considering the difference it makes in growth. My fields really came back strong after apply-

ing it."

Joe puts up about 200 tons of grass silage a year. "I give the cows all they can eat," he says. "This amounts to about 75-80 pounds a day per cow during the winter months." Grass silage, Joe feels, is the closest thing to pasture you can get. He finds silage best for production in most cases and, he says, "of course, it's easier to make first class silage than it is to make first class hay. Haying weather," he emphasizes, "was exceptionally good this year so some dairymen may give me an argument here." Joe made first class hay from his second cutting this year, silage from the first.

The bulk of Joe's silage comes from the red clover-ladino-orchard fields. The material is ensiled with about 80 pounds of molasses per ton.

When it comes to putting up silage and hay, Joe has a unique setup, made necessary, he tells you, by the fact that he runs the farm himself. Joe uses a field chopper and blows his grass into the silo, or if hay, into the mow. "If a storm comes up while I'm putting in clover hay, I switch the blower from the mow to the silos and put the hay in as silage. It may not be first class silage, but it's better than losing it altogether." Joe put up about 35 tons of clover hay this year.

Every pasture on the farm is clipped at least three times a year to obtain good fresh growth and to hold down weeds. The judges deducted only one point because Joe let some orchard grass get mature, but deducted none for weedy pastures.

In the fall and early spring, Joe takes samples of every field and has the soil tested. He then follows the fertilizer recommendations of the college. This year all permanent pastures were top dressed with 400 to 500 pounds of 0-20-20 per acre. Manure was spread on the oldest sod—it being first to get reseeded.

The pasture setup is laid out so all but one field touches on a creek running through the farm. There is a spring in the other field. Every field is fenced off with an electric fence. There are six circuits, all on one controller located in the barn. "You'd be surprised how many steps this saves," Joe comments, "because whenever there is a short, I can almost pin it down to the exact spot just by checking the controller."

In the barn Joe's handywork has enabled him to get along without hired help. Joe did almost all the building, the plumbing, and the electrical work. At present he is building a 24x40 foot extension to his barn which will be used for young stock. Labor saving devices are many. For instance, Joe installed his own barn cleaner. When remodeling

the 40x90 foot barn, Joe put in four box stalls at one end, which presently house young calves, and made allowance for the barn cleaner to run through them. These, he says, need to be cleaned only about once every six months, the reason being that the floors of the pens slope slightly from back to front. "The animals tend to scuff most of the wet or dirty bedding forward where it drops into the gutter and is carried out by the barn cleaner daily." New bedding is added when needed.

The feeding process is as effortless as possible. Joe installed his own bulk feed bin in a room next to the silos. The bin is about four feet off the floor. While it will hold three tons of feed, Joe has only two tons delivered at a time to maintain freshness. To feed, he simply backs his homemade cart under the bin opening, and an old combine augur in the bottom of the bin, powered by a small motor, brings out the feed.

Joe never has to lift a milk can. All cows are machine milked in the stanchions and the milk stored in a cooler in the milk room at one end of the barn. Joe bought a milk can hoist but put it to double use. He installed an overhead garage track in the milk room from cooler to delivery door. The hoist was fitted to the track. He hoists the can electrically via the milker pump, then pushes it on the track to the waiting truck.

Joe came to New Jersey from Staten Island as a student in dairy husbandry at Rutgers university in 1942. After graduating in 1946, he married, worked out for a short while, and took over his present Hunterdon county farm in 1948.

The Adda home has undergone almost as many changes as the farm buildings. He and his wife, Anne, have only recently completed a new fireplace and an overhauling job on the entire front of the house. Together, the Addas have done a lot of building in only four years. A new machinery shed is the next project, not to mention still further improvement in the grassland program.

Energy, careful planning and good management have given this splendid family a good start on the road to independence.

Guard against ketosis in your ewes by feeding one-fourth pound of grain a day with plenty of good legume hay, starting the eighth to sixth week before lambing.

Manure produced by a dairy cow in a year averages about $30 worth of nitrogen, phosphorus and potassium, according to an Illinois dairy specialist.

Major Changes Affecting the FARMER'S 1952 INCOME TAX

Condensed From Michigan Farm Economics

E. M. Elwood

YOU may not find the job of figuring your income tax quite so hard this year. The tax forms, procedures and information needed are the same as last year. There are, however, some changes brought about by the Revenue Act of 1951, the effects of which will not be fully realized until the 1952 tax year. Following are the major changes that will affect you as a farmer:

1. *Tax Rate Increase*—The increase in tax rates provided for in the Revenue Act of 1951 took effect late the same year, but apply to the entire year of 1952. The tax rates on 1952 incomes are, on the average, about nine per cent higher than those on 1951 incomes.

2. *Capital Gains* — For 1952 and thereafter, the "50 per cent rule" (when schedule D is used) can be applied to any long-term capital gain only *after* any short-term capital loss has been subtracted. Prior to 1952, the 50 per cent rule was applied to capital gains *before* short-term capital losses were subtracted.

3. *Sale of Draft, Breeding or Dairy Animals*—There has been a further clarification of the conditions under which sales of breeding, dairy and draft animals are treated as "sales or capital assets." When so treated they will be reported on Schedule D (Form 1040), where only 50 per cent of the net gain from capital gains and losses will be taxable income.

If a sale of livestock is to be treated as a sale of a capital asset, the following requirements must be met:

a. The animal must have been owned for 12 months or more.

b. The animal must have been held for draft, breeding or dairy purposes, and not primarily for sale in the ordinary course of the farm business.

The term "livestock" is given a broad interpretation and includes cattle, hogs, horses, mules, donkeys, sheep, goats, fur bearing animals, and other animals. It does

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Extension Service, East Lansing, Michigan

not include chickens, turkeys, pigeons, geese or fish.

The determination of whether or not livestock are held for draft, breeding or dairy purposes depends upon all the facts and circumstances in each particular case. The purpose for which the animal is held is ordinarily shown by the taxpayer's actual use of the animal. An animal is not considered as being held by the taxpayer for draft, breeding or dairy purposes merely because it is suitable for such purpose; or because it is held by the taxpayer for sale to other persons for use by them for such purpose. Following are some examples illustrating these principles:

Example 1: An animal intended by the farmer for use by him for breeding purposes is discovered to be sterile and is disposed of within a reasonable time thereafter. This animal was held for breeding purposes.

Example 2: A farmer decides to quit the livestock breeding or dairy business and sell his entire herd, including young animals which would have been used by him for breeding or dairy purposes, if he had remained in business. These young animals were held for breeding or dairy purposes.

Example 3: A farmer in the business of raising hogs for slaughter customarily breeds sows to obtain a single litter to be raised by him for sale and sells these brood sows within a reasonable time after obtaining the litter. Even though these brood sows are held for ultimate sale in the ordinary course of the taxpayer's trade, or business, they are considered to be held for breeding purposes.

Example 4: A farmer is in the business of raising registered cattle for sale to others, for use by them as breeding cattle. It is the business practice for the cattle to be bred prior to sale in order to establish their fitness for sale as registered breeding cattle. In such case, those cattle used to produce calves which are added to the herd are considered to be held for breeding purposes. The use of the other young cattle for breeding purposes is considered to be an ordinary or necessary incident for the purpose of selling them as registered breeding cattle, and such use does not demonstrate that the taxpayer is holding the cattle for breeding purposes. The same applies to hog and sheep breeders.

Example 5: A farmer, engaged in the business of buying cattle and fattening them for slaughter, purchased cows with calf. The calves were born while the cows were held by the taxpayer. These cows were not held for breeding purposes.

A change in the Revenue Act of 1951 provides that a farmer who reported as ordinary income the gain from the sale of dairy, breeding or work stock in 1949 or 1950 that were held over six months may make an amended return treating the sale of such animals as the sale of a capital asset and file a claim for refund on Form 843.

In addition, he may make an amended return for any year with respect to which a consent agreement (Form 872) is still in force. He also may make a claim for refund for any previous year for which additional payments have been made within the past two years.

In reviewing the request for refund the entire return and the supporting evidence is subject to rechecking by the collector.

Building Fertility Cheaper Than Buying More Land

You can build soil fertility cheaper than you can buy it in the form of additional land, say agronomists at the University of Nebraska.

By investing $50 to $75 per acre in soil building measures, you can make low producing "middle class" land the equal of top yielding soil within a year or two, according to the agronomists. Thus you save yourself the expense of buying high priced land and you double or triple the return per acre.

Accomplishing such results involves several steps. You have to restock the soil's plant nutrient supply so it can feed the crops you grow. You have to make it a better storehouse for moisture. You have to add organic matter and build up the soil's tilth so it is easy to work and so crop roots have plenty of "leg room."

Agronomists recommend these measures for building up the soil:

1. Add lime as needed, according to soil tests.

2. Give the soil a full feed of nutrients. That means heavy applications instead of a "salt shaker" approach. It means using recommended amounts of fertilizer before planting, suitable fertilizer as top dressing or side dressing, as indicated by soil tests.

3. Condition the soil so it can make maximum use of the fertilizer you add. This can be done by a rotation centered around well fed, deep rooted legumes and grasses.

4. Return roots, leaves, straw, cornstalks and cobs, and other crop residues to the soil.

5. Make good use of all the manure available.

— University of Nebraska

Profit in Pint-Size Ponies

Mark Hannah of Texas Makes More From Shetlands Than From Herefords

Condensed From The Cattleman

Wayne Gard

HOPALONG CASSIDY and the Lone Ranger are sparking Young America's interest in the horse. On radio and television and in newspaper comic strips, they keep alive the idea of a horseman as a hero. Boys too young for gasoline scooters and motorbikes begin clamoring for live mounts. Their demand is putting money into the pockets of those who operate Shetland pony ranches.

The market for Shetlands, which declined during World War II, has since become strong again. So much so that some Texas cowmen who began raising them as a sideline now find the ponies their main source of profit. One such is Mark Hannah, who is serving his second term as mayor of Denton, Texas. On his ranch of more than 500 acres, six miles northeast of town, he makes more from his ponies than from his Herefords.

"I can run 25 Shetland ponies where I could run 10 Hereford cows," he explains. "Except when the ground is covered with ice or snow, the mares and colts live on grass and never get a bite of anything else. Even when the grass is crusted over, they get only hay. The stallions, which are kept penned from late summer until March, are fed oats and hay."

Hannah has had a steady interest in Shetland ponies ever since his parents bought him one when he was four or five years old. Now he keeps 75 or more ponies in his high, rolling pastures, dotted with post oak and mesquite. He ships some for youngsters as far off as New Mexico, Colorado, Missouri and Georgia.

Hannah's interest in Shetlands was intensified when he had a child of his own. His daughter, Sally, began riding as soon as she was able to sit on a pony's back. Today, a girl of 14, she has outgrown Shetlands, but the business is still called Sally's Pony Farm.

On hand to demonstrate the

Reprinted by permission from The Cattleman
Fort Worth, Texas

ponies nowadays is Mark, jr., aged 5½ years. In a hat as broad brimmed as any that Roy Rogers wears, young Mark puts the ponies through their paces like the expert he is. Mark, jr., never minds seeing a pony sold. He knows there'll always be plenty left for him to ride.

Hannah has exhibited ponies at shows in many near-by cities, but he doesn't go in for collecting ribbons. For many years he has used only purebred, registered stallions. He is interested mainly in raising ponies to sell to people who want them for their children. He sells about 25 a year. The horse colts bring $125 to $150 each, the filly colts $250 to $300. Many are sold as soon as they are weaned.

The top price received by Hannah was $550 for a stallion he sold at a national Shetland pony sale at Gainesville two years ago. Some mares bring as high as $500. During the fall, Mark Hannah and Will Williams, a veteran Denton breeder who began raising Shetlands after he bought one for his daughter, arrange a pony show at the Denton County Fair. This event draws exhibits from other counties and sometimes from outside states.

For many years, Hannah recalls, he and Williams were the only Shetland breeders in their section. Now there are many, but the demand still exceeds the supply. Hannah sells mainly to parents, but some of his ponies go to circus men and operators of commercial rides. The ponies range from 33 to 43 inches in height. The smaller ones usually bring a little higher price.

Hannah breeds his ponies for color. Once the spotted ones were in strongest demand. Then favor turned to the dapples. In the last two or three years, sorrels have become the most popular. But many youngsters still prefer one that looks like Old Paint. Some parents, Hannah says, ask for an old and gentle pony. But he advises them to pick a weanling colt. It will become gentle in a few days, and it will grow up with its young rider. A child's pony, he points out, needs only a gallon of oats and a block of hay a week and can be fed for about $2 a week.

Hannah and five other men operate the Denton County Rodeo Association, which gives performances every Saturday evening in summer. Rounding up stock for this rodeo takes much of his attention, but he always finds time to look after his Shetlands. He and Williams have had a big part in the growing popularity of the pint size ponies in Texas.

Smallest of the several pony breeds, the Shetland ranges in height from a record 17 inches to 45 inches. Although all came originally from the Shetland Is-

lands, off Scotland, there is now considerable difference between the British ponies and the American ones. Until recently, most of the British Shetlands were used for work rather than for pleasure riding. They formerly hauled coal in the mines of Scotland and England, and many still are used as draft animals. Those in America have been bred for more graceful appearance for use as children's mounts.

With a thick, rugged body, short legs, and sturdy shoulders and quarters, the Shetland has more strength per pound than most mounts. One pony, only 36 inches high, is said to have carried a 170 pound man for 40 miles over hilly roads without stopping to rest. American Shetlands aren't called on nowadays for such feats. But those who watch the performance of ponies on the Hannah ranch can easily see that they have strength and endurance as well as pleasing lines. For the youngster too small to ride a cow pony, the Shetland is an ideal mount.

Woodland Pays $4.56 an Hour

Like the sound of a job paying $4.56 an hour? Wisconsin forester Fred Trenk says that was the labor income for woodland in a demonstration forest this year.

Trenk figures a farmer may be able to earn that much for time spent in his woodlots, with two "ifs" — *if* the quality of your timber is good and *if* you do selective cutting. That means thinning out your trees so the rest get a chance to grow. He kept close records of costs, labor and income. Here are his figures: *Labor*—total time for felling, bucking, skidding and decking — 120 hours. *Costs*—tractor and chain saw rental, 2 years land tax, and stumpage tax. Total $110.40. *Yield* (decked in the woods)—4,380 board feet of sawlogs, 16.15 cords pulpwood, and 12.85 cords bolts. *Total value $658.49.*

Trenk then subtracted his costs from the value of the products and divided that by the 120 hours of work to find that he could make $4.56 an hour for time spent in the forest.

— *University of Wisconsin*

Beef cattle on brush cleared pastures at the Spur (Texas) experiment station this year produced 53 per cent greater gains than did those on brushy pastures.

Lower feeder prices and ample feed supplies in the Corn Belt may result in greater shipments of feeder cattle into that area in 1953.

CORN FOLLOWING CORN

Big Yields Are Possible —

Condensed From The Farmer

William H. Kircher

"WHEN we were getting two or two and a half tons of hay per acre we needed more hay land. Now, after fertilizing, we get four tons per acre, in some years more, and we have hay sticking out our ears. Nobody around here will buy it. Freight charges eat up the profit if we try to ship it. And don't suggest a larger cow herd. We can't get the kind of help we want. So how are we going to keep our land in good shape, and not have more hay than we can use?"

That problem of a friend of ours is common on many a Corn Belt farm.

Too Much Oats

And there is another problem. More farmers have land seeded to oats than they would like. In Steele County, Minnesota, for example, there were 67,537 acres of corn last year, and 55,370 acres of oats. There were only 27,320 acres of hay, indicating that perhaps not more than one-third of the oat acreage was needed as a nurse crop for legume and grass seedings. Considering that neither the dollar return nor nutrient return per acre from oats is more than half that of corn, the near equality of oat and corn acreage indicates that a better rotation is needed.

But if you follow corn with corn two or three years, won't the corn yield suffer? Won't you be mining the soil? Taking a loss from erosion?

That latter question is a worrisome one. Without contouring or perhaps terracing on slopes, there will be soil loss. But farmers who have followed corn with corn—good farmers, not the kind who farm without regard to what is happening to their land — have second and third year corn crops as good as the first crop after alfalfa.

In Corn 33 Years!

There is an extreme example on Purdue university's soils and crops farm near LaFayette, In-

Reprinted by permission from The Farmer
St. Paul, Minnesota

diana. On a field there, corn has followed corn since 1919—for 33 years. In spite of annual applications of 200 pounds of 0-12-12 (12 pounds of phosphate, 12 pounds potash, no nitrogen), the average yield for the four years 1944 through 1949 was only 49 bushels. With the addition of 80 pounds of nitrogen fertilizer an adjoining 33 year continuous corn plot made 87½ bushels per acre. All that was needed was a plant food balance and the yield jumped in spite of long continued corn. None of the root rots or other diseases had taken over, nor had there been a build-up of insect population to pull the yield down.

Could the same good yield be expected in Minnesota on land continuously in corn, even with abundant plant food? There are no very long experiences with continuous corn in the state, but there are many with two or three years. On Byron Howard's farm near Amboy, Minn., there is a spectacular example.

The Howards bought their place in 1949. Parts of it had been run down. A field near the highway yielded 35 bushels per acre last year. Partly to discover how well it would respond to fertilizer and partly to arrange fields so he can work them into his cropping system, Mr. Howard put this field into corn again last spring. It was fall plowed, and in April he disked in 500 pounds of 8-16-16. That was supplemented with 150 pounds of 4-24-12 with a planter attachment, and finally, during the second cultivation he put on 300 pounds of nitrogen fertilizer with a cultivator attachment. Result: The yield was 140 bushels per acre.

Fertilizer cost on the heavy fertilized plot was $38.37 per acre. But it was reduced to $14.65 per acre on another plot that yielded 109 bushels per acre. On this one he didn't make the 500 pound broadcast application. He applied 150 pounds of 4-24-12 with a planter attachment, and 200 pounds of nitrogen fertilizer with a cultivator attachment.

$3 for Each $1 Invested

The comparison between the fertilized plots and the unfertilized tells the story. The unfertilized yielded only 48 bushels. On the heavily fertilized plot, valuing corn at $1.50 per bushel, $38.37 worth of fertilizer brought $138 worth of corn, or returned more than $3.00 for each dollar invested. On the plot not so heavily fertilized which yielded 109 bushels per acre, $14.65 worth of fertilizer brought $91.50 worth of corn or more than $6.00 for each dollar invested. In addition, it was proved that extremely heavy yields of corn are possible on land planted to corn the previous year.

Near Vernon Center in Blue Earth County, Minnesota, on the

farm of W. A. M. Noy is another field on which corn is following corn. All except a small area on this field was fertilized with a broadcast application of 500 pounds of 5-20-20 and side dressed on the second cultivation with 150 pounds of nitrogen fertilizer. The unfertilized corn appeared to be "firing" from the time it tasseled on through the rest of the summer. The other retained its lush black green color. Seen near harvest time, it obviously was going to make a much heavier yield.

Mr. Noy's place is in an area where there is a market for canning peas so he has a somewhat wider selection of crops to include in his rotation than some other farmers. Ordinarily his rotation is peas and alfalfa, alfalfa, corn, and soybeans. When he bought the 260 acre place, there was a 1,600 bushel crib on it. He built another of 2,500 bushel capacity. This year he plans to build another 1,600 bushel crib — proof that corn is coming off the land in much greater quantity than it once did.

Levern Wilker, Steele County, Minnesota, where oat and corn acreage are nearly equal, figures he must follow corn with corn to get the most out of his land and his fine herd of Holsteins — 30 milking and about 40 head of young stock. He also raises about 300 head of hogs a year.

Standard rotation on the Wilker farm is oats seeded down, one year hay, one year pasture, and two years of corn. In 1950 and '51 his corn following corn outyielded corn following sod. This year it hasn't.

Fall Plows When Possible

Like most other farmers who get good yields of corn following corn, Wilker fall plows when it is possible. Manure is spread on that land during the winter. He uses a starter fertilizer in a planter attachment — 125 pounds of 4-24-12 or 5-20-20, and in the future will side dress with nitrogen fertilizer.

What's happening to the organic content of this heavily "corned" soil? What about drainage that comes of deep rooted legumes, particularly alfalfa? If this continuous corn, corn, corn goes on a few years, won't the soil become hard to work? Answering those questions in order: Organic matter could decrease, soil drainage could become a problem, and soil could become extremely hard to work, but none of this deterioration needs to occur.

The field on Purdue university's experiment farm has produced 87½ bushels per acre after more than 30 years of continuous corn. It couldn't have been in very bad condition.

The farmers who are successfully following corn with corn are not stalk burners. They are aware

of the need to get organic matter back in the soil, corn stalks, pigeon grass, any growth they can turn under.

15,000 Plants Per Acre

And to get the kind of yields they are getting they must have a dense population of corn plants. Not 8,500 per acre as they would have with 40 inch by 40 inch check rowed corn planted three kernels to a hill. They drill their corn, setting the planter to drop a kernel every five or six inches, and get a plant population upward of 15,000 plants per acre. Then they fertilize so there is plant food for that dense population. Thus they have a lot of organic matter to turn under as well as a lot of corn to harvest.

But still, what about the need for alfalfa or some other deep rooted legume? Is it necessary to maintain good soil structure? A county agent asked that question of Dr. George Scarseth, research director of the American Farm Research Association, on a recent Minnesota field trip. Dr. Scarseth put his reply in three questions: "Aren't our prairie soils the richest we have? Didn't grass, not legumes, cover those rich acres? Isn't corn a grass?"

Overfeeding Calves More Harmful Than Underfeeding

Milk is a valuable product and shouldn't be used for overfeeding calves, says Nebraska extension dairyman C. W. Nibler. Generally, he says, the amount of milk recommended is 10 per cent of the live weight of the calf. So, for example, a 120 pound calf needs 12 pounds of milk daily.

Overfeeding, too, may cause digestive troubles for the calf, says the dairyman. The calf's food passes directly into the fourth or true stomach instead of being stored or soaked in the rumen, regurgitated and passed into the true stomach in older animals. Calves don't have the ability to chew their cud. This comes later as the first stomach develops. An excess of milk many times will spill into the calf's rumen where it spoils or ferments, causing digestive troubles. Overfeeding of milk at an early age, says Nibler, is more harmful than when calves are underfed on milk. — *Nebraska Extension*

Prospects this year are for an all-time record rice crop of 45.4 million bags—four per cent greater than 1951's crop.

An effective method of pasteurizing liquid whole eggs has been developed by the United States Department of Agriculture.

New Seed Treatment Gives Better Stands of Hay and Pasture Plants

Condensed From Product Information Service Bulletin

CHEMICAL "overcoats" for tiny grass and legume seeds accounted for increased numbers of hay and pasture plants in 134 farm fields in 28 states, from Vermont to California and from Georgia to Oregon, during the past summer.

The fields were part of a nation-wide experimental program in which farmers co-operated with representatives of the Du Pont Co. to test the chemical treatment of forage crop seeds under actual farm conditions. In each case, the same seed was used throughout the field, with the chemical treatment applied to seeds sown in half the field and the remainder planted without treatment.

Eleven different forage crops were involved in the tests. When plants had emerged and were in a healthy growing condition, farmers, county agricultural agents, soil conservation workers and others interested in the experiment accompanied Du Pont field representatives in making actual counts of the number of plants in parallel areas throughout treated and untreated sections of the fields. While differences in stand varied depending on the area where crops were planted, amount of rainfall and soil moisture and cultural practices, the following table shows that increased stand in favor of seed treatment was impressive throughout the country:

Crop	No. of Tests	% Average Increase in Stand
Alfalfa	60	32
Red Clover	27	61
Crimson Clover ..	3	19
Sweet Clover	4	108
Ladino Clover	2	3
White Clover	2	5
Birdsfoot Trefoil .	2	65
Lespedeza	11	53
Legume Mixtures .	11	22
Sudan Grass	7	30
Misc. Grasses ...	5	42

The chemical used on the seed to produce these increases in stand is an organic sulfur compound known as "Arasan" seed disinfectant. It acts as a protectant for the tiny seed and seedling against the attack of disease or-

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E. I. Du Pont De Nemours & Co., Wilmington, Delaware

ganisms in the soil or on the seed coat which can produce seed rot, seedling blight or "damping off," a disease which causes wilting and death of the young plant within a few days after its emergence from the ground. Without chemical protection, a large percentage of all seeds planted may succumb to these diseases and never reach maturity.

Some of the increases in stand were spectacular. At Lander, Wyoming, Allen Cornwell found that treated seed produced 249 per cent more sweet clover plants than did untreated seed. At Anderson, South Carolina, treated lespedeza seed on the farm of Harry Drake gave 212 per cent better stand than untreated seed. J. H. Kent at Columbus, Mississippi, saw a 186 per cent increase in plants from treated seed of Kentucky 31 fescue grass as compared with the untreated section of a pasture planting, vitally needed in this drought year. At Olathe, Kansas, seed treatment produced 123 per cent more birdsfoot trefoil plants for S. R. Hutcheson. Rew Bergoin of Malvern, Iowa, showed a 115 per cent increase where treated seed was sown in a red clover field.

The most commonly tested crop was alfalfa. Top increases in this important hay crop were shown at Malvern, Iowa, where C. K. Stewart had a 118 per cent increase in stand in favor of seed treatment; at Barnsville, Minnesota, where a 112 per cent increase was chalked up in the field of Harold Janneck; and in Turlock, California, where seed treatment produced a 101 per cent increase for T. C. Dilworth.

Increased stands did not tell the entire story of the value of treating the seed with "Arasan" seed disinfectant. Since the chemical allowed the plant to get its start in life free of disease onslaughts, healthier root systems and faster growth were frequently noted in comparison with plants from untreated seed. In cases where the crop is raised for hay, this can mean more bales per acre. In Pennsylvania, Oklahoma and California, alfalfa growers have harvested a third more hay from treated sections of their fields, and in two cases where the fields were planted in 1951, this increase has carried over into the second year.

The 1952 tests constituted the third series of actual farm trials which have been used to evaluate seed treatment of forage crops.

Growers may either buy "Arasan" seed disinfectant and treat their seed before planting, or have the seed treated mechanically by local seed firms. A number of the larger seed companies now offer seed for sale which has been treated. In all cases, treatment costs only one or two cents per pound of seed.

Check These Legal Safeguards

BEFORE YOU BUY A FARM

Condensed From New England Homestead

Carl O. Chauncey

Assistant General Counsel
The Federal Land Bank of Springfield, Mass.

SO YOU are going to buy a farm! You have, perhaps, found the farm that suits you. Or you may be still looking around. In either case, you probably intend to see a lawyer before you pay over any money because you are aware that only a lawyer is qualified to assist you with the legal technicalities involved in the purchase of real estate.

Under the law of most states, no agreement for the purchase or sale of land is enforceable unless it is in writing and signed by the party against whom it is to be enforced. This means that so long as your bargaining is only by word of mouth neither you nor the prospective seller is bound by any agreement. On the other hand, it also means that there is a possibility that either or both of you may become bound sooner than you expect, if you do your dickering by mail and reach an agreement, as it is not necessary (although usually desirable) that the whole contract be contained in a single formal document.

The lesson in this is that you should talk with your lawyer and get his advice before you make an offer to buy or accept an offer to sell. He can guide you in your negotiations so that when you and the seller reach an understanding you will have settled all the points which are to be written into the formal contract. There are certain things on which it is very important to reach an agreement and to put into the written contract.

These are discussed in the following paragraphs.

1. *An accurate legal description of the land.* This will be necessary anyway when the deed is executed, and it may save a dispute as to whether the deed covers the land, and all the land, agreed upon. For legal purposes the farm should be described as specifically as possible with mention of location, boundaries, corners, acreage, ad-

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Springfield, Massachusetts

joining owners, etc. A survey description is good to use if available.

In addition, you and the seller should agree as to what goes with the farm as part of it. There will be no question about the permanent buildings, but such items as pumps, irrigation equipment, milk coolers, removable stanchions, tobacco poles, venetian blinds, etc., have been the subjects of dispute. The only safe procedure is to walk over the premises with the seller and reach an agreement which can be included in the written contract, on every item not so firmly attached to the soil or buildings that it couldn't be removed.

2. *The price to be paid.* Sometimes the purchaser agrees to assume and pay an existing mortgage on the farm as part of the purchase price. If you are going to pay in cash only the difference between an existing mortgage and the agreed price, the written contract should set forth that understanding. It probably goes without saying that you will want to learn the amount and terms of such a mortgage before agreeing to assume it.

3. *The time, place and manner of payment.* You will want sufficient time for your lawyer to check the title to the property and for the necessary papers to be drawn. If you intend to obtain a mortgage loan with which to pay cash, time must be allowed to negotiate it and for the bank to satisfy itself as to the seller's title.

In the event the agreement is that you may pay the purchase price in installments, there should be an understanding as to the amount and time of payment of the installments and the interest, if any, to be paid on the deferred installments. You will also want the contract to provide that you have the right to pay any or all of the deferred installments before they become due.

4. *The security for deferred payments.* If the seller isn't to receive payment in full immediately, he will undoubtedly require "security" for the future payments. There are two methods commonly followed to provide such security. One is by the contract itself. The purchaser agrees to pay the purchase price in the amounts and at the times set forth, and the seller agrees to give a deed only when the full price has been paid. The other method is for the purchaser to give the seller a promissory note for the balance of the purchase price and a mortgage on the property to secure the note, at the same time that the seller gives the purchaser a deed.

If possible, the contract should be written by your attorney, or approved by him, before you sign. Likewise, you will want his prior

approval of any note and mortgage.

Unless the seller is willing to accept a mortgage containing as favorable terms as you can obtain from an institution engaged in making long term mortgage loans, it may be to your advantage to borrow what you need and pay cash to the seller. During the past 35 years, many farmers have financed the purchase of their farms with Federal Land Bank loans. Some of the attractive features of such loans are these:

a. Semi-annual payments spread over as many as 33 years.

b. The rate of interest is low.

c. Interest is charged only on the unpaid balance.

d. The borrower may pay in advance as much of the loan as he wishes at any time without penalty.

Further details about Federal Land Bank loans may be obtained from the National Farm Loan Association in your neighborhood.

5. *Transfer of possession.* Whether you intend to pay cash, "buy on contract," or give a mortgage to the seller, there should be an understanding between you and the seller as to when you are to have possession of the property and may occupy it. The contract should specify the date.

6. *Insurance.* Usually, the execution of a contract of sale automatically terminates any insurance which the seller may be carrying on the property. The contract should stipulate what insurance is to be carried, who is to take it out, who is to pay the premiums and how the proceeds of the policy are to be applied in case a loss is suffered.

You should realize that after a contract has been executed, the risk of accidental destruction of improvements on the premises is upon you, even though you have not yet acquired title. That is, if you agree to buy a farm for $10,000, you to take possession immediately and pay the purchase price one year later, and during that year the buildings which represent a substantial portion of the total value are burned, you will still have to go through with your contract and pay the full $10,000, unless the situation is provided for in the contract.

7. *Taxes.* Unpaid real estate taxes are a lien on the farm. Ordinarily the purchaser looks to the seller to pay any back taxes that are unpaid, and the purchaser and seller "adjust" the taxes for the current year between them according to the custom of the particular locality. The purchaser pays the taxes which are assessed after he takes possession. The understanding about taxes between you and the seller should be written into your contract.

8. *A good, marketable title.* Your contract should provide that

the seller will convey to you a good and marketable title to the farm free from liens and encumbrances (except any mortgage which you agree is to remain) and if he is unable to convey such title then you are under no obligation to go through with the purchase.

In some localities it is the custom for the seller to furnish the purchaser with an abstract of title. An abstract is simply a copy of all the conveyances and legal proceedings affecting title to the farm which are on public record. If it is the custom in your locality for the seller to furnish an abstract, your contract should require him to do so. Any abstract you receive should be carefully preserved so that you can pass it on if you, yourself, should later sell the farm.

9. *The deed.* Deeds generally are of two kinds—quitclaim (or bargain and sale) and warranty. They are equally effective to convey whatever title the seller has, but if it should subsequently appear that the title was defective, the purchaser who receives a warranty deed can sue his seller for any resulting loss. It is so customary to transfer by warranty deed that a purchaser who cannot obtain an agreement from his seller to give one should immediately consult with his attorney before proceeding with the transaction, for it may imply a lack of confidence by the seller in his own title. However, deeds by people acting in official or semi-official capacities—such as guardians and executors, or sheriffs—often have special form and seldom contain full or any warranty. Such deeds do not necessarily imply any weakness of title.

In discussing the forms of warranty and quitclaim deeds it is proper to point out (a) that the warranties of the seller extend only to questions of title; (b) that the warranty is of value only in so far as the seller is financially responsible, and able to respond in damages if sued; and (c) that if the seller has title—concerning which the purchaser presumably has assurance from the examination of the abstract or search of the records—a quitclaim (or bargain and sale) deed is equally effective. However, a warranty deed does add additional protection and, in addition, will have the effect of automatically passing to the purchaser a title interest which the seller might acquire after he sold the land, though he did not have it at the time.

The contract should also specify to whom the deed is to be given, that is, the name or names of the person or persons who are to own the farm when the deal is completed. They are called the grantees. You alone may be the grantee, or you may take title with someone lese. Two people may

own property "in common" or "jointly." If the deed describes them "as tenants in common," and one dies, the heirs of the deceased become "tenants in common" with the survivor. On the other hand, if the deed describes the grantees "as joint tenants with right of survivorship and not as tenants in common," and one dies, the survivor is the sole owner. A husband and wife will often take title "as tenants by the entirety." In this form of ownership, which may be held only by husband and wife, the survivor is the sole owner when one dies.

When an agreement has been reached on these nine points, a written contract should be prepared in duplicate and both copies should be signed by both parties, each retaining a copy. If the seller is married, it is usually essential that his wife or her husband, as the case may be, sign the contract. The wife of the purchaser need sign only if it is desired to make her liable for performance of the contract. Some states require that the signatures be witnessed. It is to the advantage of the parties to have the execution as well as the drafting of the contract supervised by an attorney.

If there is to be any appreciable delay between the date the contract is executed and the date when a deed is to be given (and this is often the case when the purchase price is to be paid in installments), it is desirable for the purchaser to have the contract recorded in the land records. Such recording protects the purchaser against loss of his rights through a subsequent sale of the land by the seller to a third person. However, in order for the contract to be recorded the signatures must be acknowledged before a notary public or other officer permitted by law to take acknowledgements. Therefore, if the purchaser intends to record the contract, he should have the seller and his wife (or her husband) not only sign the contract but acknowledge it also.

One cannot sell what he does not own. Though you pay full value in the best of faith, and your seller gives you a perfect deed, if the seller does not have title to the property the true owner can dispossess you. The only way to be sure of the seller's title is to have it examined. If the seller furnishes an abstract, you should turn it over to your lawyer for examination. In the event no abstract is furnished (and it is not customary to furnish an abstract in many places), you should ask your lawyer to "search" the records. From his examination of the abstract, or the results of the search he will be able to tell you whether the seller can convey a satisfactory title.

Two things your lawyer cannot

do simply by examining the abstract or searching the records. First, he cannot tell if the land is in the possession of some third person who claims to be there rightfully. Such adverse possession, as it is called, may be continued long enough to ripen into a title which is superior to the record title. Even if the possession or use has not become title, it may signify a claim of which you are bound to take notice. You must investigate the possession and use for yourself and tell your lawyer what you discover, so that he may advise you of its legal effect. Second, unless your lawyer is personally acquainted with the property he can't tell you from the description whether that description fits the land you want to buy. Unless you are certain of that fact yourself, it may be desirable to employ a surveyor who will go to the farm you intend to buy and find out if its boundaries correspond to the description.

You should not pay for the land or accept a deed until your attorney has given you his opinion that the seller is able to convey a good and marketable title, and that the deed tendered by the seller is satisfactory and complied with the contract.

There is a federal tax on the sale of real estate. It is the obligation of the seller to buy the proper revenue stamps and put them on the deed when it is delivered to you. It is also the obligation of the seller to furnish discharges for any mortgages or other liens which are to be discharged when you take title, and to pay the fees for having them recorded. When you receive your deed, take it at once to be recorded in the land records. Your lawyer will tell you where, or will take care of it for you. You will pay the fee which is charged for recording it. Unless your deed is recorded immediately you run the risk of the seller conveying the land to someone else, who, if he bought in good faith and for value and recorded his deed promptly, might then have better title than your own. Or though the seller is perfectly honest, he might be unfortunate in business and a creditor who filed suit against him might acquire a lien against the land superior to your title. Do not delay in recording your deed.

Sawlog Values to Remain High — Careful studies by forest economists indicate that sawlogs will be scarcer in relation to needs in coming years. Also, experience in older countries indicates that this is true. Stumpage values in Sweden, for example, are approximately $60 per 1,000 board feet compared with $25 for comparable logs in this country.

Colored Folks Move In and Out of This Model House to Learn Better Living —

Condensed From Extension Service Review

Sherman Briscoe

USDA Information Specialist

A NEW approach to better rural housing is being tried by the colored home demonstration agents of South Carolina.

Near Kingstree, South Carolina, last May, they dedicated the first farm demonstration house of its kind in the nation—a six room modern rambler in which 30 rural families a year will each have the opportunity to spend a week, learning first-hand about better housing and modern conveniences.

At first only 4-H club girls lived in the model house, but in September or early October, the first family moved in and got a sample of better living. And, thinks Mrs. Marian B. Paul, state home agent for Negro work, "the family will never be satisfied again with their old home without electricity and running water and a modern kitchen."

Mrs. Paul says that one young farm family in each of the 30 counties where a home agent is employed will be selected each year to spend a week in the home between fall and late spring. A full time home management worker is to be employed to assist the families in having the most fruitful experiences possible.

Objectives of the demonstration house, says Mrs. Paul, are: (1) to motivate the families to improve their homes; (2) to train the women in better methods of home management and in the use of labor saving devices, (3) to develop a model lawn, garden and poultry flock, and (4) to make the house useful for educational and recreational purposes.

The idea for such a home was conceived by Mrs. Paul six years ago. She took her plan to the General Education Board and was granted $7,500 for the project. Home demonstration clubs and business firms in the region contributed the rest of the funds and furnishings for the model home. They gave timber, an electric pump, rugs, bedspreads, towels

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Washington, D. C.

and material for draperies.

The attractive $8,200 cement block rambler has a living room, dining room, U-shaped kitchen, three bedrooms, including a children's room; bathroom, front porch, screened back porch, and ample storage space. All the windows have full length screens.

The home is furnished with used furniture that has been refinished and reupholstered. For example, the agents and clubwomen were given an old overstuffed chair which they renovated at a total cost of only $17. They now value the attractive chair at $85. Total furnishings, exclusive of the electric appliances cost only $165, but are now worth close to $2,000.

The electrical appliances — stove, refrigerator, automatic washing machine and ironer — cost them $614 at a 45 per cent discount. This equipment will be replaced every two years by the latest models, and the home economist of the appliance firm will give demonstrations in the proper use of the equipment twice a month.

"Perhaps a practical demonstration in better living may help to stimulate the construction of improved homes. We hope our house serves such a purpose," says Mrs. Paul.

No Corn Quotas in 1953

Supply of corn is below the quantity which would require marketing quotas under provisions of the Agricultural Adjustment Act of 1938, as amended. In order to proclaim marketing quotas, the supply would have to total 4,244,000,000 bushels. The actual supply for 1952-'53 has been established at only 3,793,000,000 bushels, which is 451 million bushels less than the amount required for quotas.

Action in dispensing with acreage allotments, as authorized by the act, has been taken to help maintain a continuous and stable supply of corn during the defense emergency. During the past two years, the reserve supplies of corn in the United States have been reduced by slightly more than 350 million bushels. On October 1, 1952, the reserve stocks were down to 489 million bushels, as compared with 739 million on October 1, 1951, and 845 million on October 1, 1950.

Although the current rate of feeding is at or near a record level, the 1952 production of corn, as now estimated at 3,303,000,000 bushels, will provide a supply sufficient to halt the decline in reserve stocks and permit a slight improvement in our supply position at the end of the 1952-'53 marketing year, the USDA says.

— *Farm and Ranch News*

Box Score on
ARTIFICIAL BREEDING

Condensed From The Ohio Farmer

C. D. McGrew

NEARLY a million calves have been born in Ohio as a result of artificial breeding. This has happened in a span of 11 years since the first artificial breeding co-operative was started in Medina County. Now, over 50,000 Ohio farmers hold membership in one of the two Ohio breeding co-operatives.

Farmers have the use of semen from some 80 "super sires." At first artificial breeding was offered as a natural for the small dairyman or for the grade herd. It was soon accepted by many purebred breeders and now even some beefmen are using the service.

Figures show that a tenth of the cows now in milk production in Ohio were "test tube calves." It takes a powerful tenth to make a noticeable bulge in the entire milk production picture. But, it's there.

Average Ohio cows produced about 5,550 pounds of milk and 219 pounds of fat last year. In 1940 the figures were 4,800 of milk and 190 of fat. Since then with cows resulting from artificial breeding on the increase, average cows have jumped 500 pounds in milk production. This may not be due to artificial breeding alone, however.

In Belmont County, Hal Pennell keeps tab on the cows on test which are sired by the Northern Ohio Association bulls. Hal is the county dairy herd improvement supervisor. He reports on 38 "artificial" daughters in 20 or more herds which have records, and compares them with their dams, using the standard mature equivalent factors to equalize the records of younger and older cows.

The daughters from sires in artificial breeding have shown an improvement of 405 pounds of milk and 51 pounds of fat each year over their dams. Fat test increased from 4.69 per cent to 5.07 per cent. A large proportion of these cows were Jerseys, with

Reprinted by permission from The Ohio Farmer
Cleveland, Ohio

a few Guernseys and Holsteins.

A herd which is known widely for heavy roughage and moderate grain feeding is that at the Trumbull County experiment farm. This herd could hardly be termed pampered, for 80 per cent of the total feed nutrients come from hay, silage and pasture. These cows get about a pound of grain for each five pounds of milk.

For the past three years this herd of 27 cows has consisted solely of the offspring of bulls used in the Central Ohio association stud and its predecessor, the Northeastern Ohio Association. Every calf born in the herd since December 25, 1951, has been the result of artificial insemination.

The herd had produced from 10,000 to 11,000 pounds of milk average per cow and around 365 pounds of fat for a period of 20 years on dairy herd improvement testing. Only once between 1925 and 1946 had the average exceeded 400 pounds.

By 1948, when the milking herd was three-fourths "artificial," things began to happen. It hit 11,570 pounds of milk and 401 pounds of fat.

There were only three of the original naturally bred cows among the 26 cows in milk the following year and these were sold before the year was up. That year the herd missed 500 pounds of fat by one pound. They milked at the rate of 13,850 pounds each.

In 1950, with every cow artificial, the herd topped the 500 fat mark by 17 pounds, and for the year just recently completed made 542 of fat and was only 300 pounds of milk short of 15,000 per cow. There were no mature equivalents applied to these weights. Use of such factors would have added about 10 per cent.

A study of this herd made by the author in 1950 indicated that the first 23 artificially bred daughters had beat their dams in 10 months by 21 pounds of fat and 224 pounds of milk. The first crop of seven daughters of the second artificial generation were 1,932 pounds of milk and 107 pounds of fat better than their dams in 305 days.

Dairy herd improvement tester reports from several counties indicate that many of their top herds are mostly or entirely the result of artificial breeding.

What about the future? J. F. Kendrick, in charge of herd record investigations in Washington, reports to each state twice a year on the DHIA records for daughters of all artificial breeding bulls. The April report is for daughters of bulls currently in use. This latest listing shows 11,133 pounds of milk and 459 pounds of fat for 1,090 daughters of 64 Ohio artificial breeding bulls. This is the highest milk production level shown yet, and for the largest

number of milking daughters.

The cumulative report in October, 1951, listed records for 3,999 daughters of 304 Ohio bulls used in artificial breeding from the start. They made 9,866 pounds of milk and 417 pounds of fat which is almost exactly twice that for average Ohio cows during the same period.

It is expecting too much to hope that production rates in Ohio generally will reach 10,000 pounds of milk or 400 pounds of fat. In average herds, improvement can be made only as feeding, housing, milking practices, heifer raising and disease control keep pace with the better breeding.

In herds where these environmental factors limit the production, better breeding can do nothing. Breeding can only set an upper limit or ceiling. It's up to the dairyman to provide the floor. By 1960 or earlier, one cow in every four in Ohio will be sired by bulls capable of transmitting 400 pounds-plus inheritance.

Hog Farms Are Most Profitable

Of the three main types of Indiana farms—hog, dairy and general—hog farms were the most profitable during the years 1947-'51, say Purdue university agricultural economists. Hog farms had an average annual net cash income of $3,900 per man. General farms were next with a net cash income of $2,700 per man and dairy farms were last with an average annual net cash income of $2,100 per man.

From the viewpoint of total capital investment, it required an average investment per man of $22,000 on dairy farms, $25,000 on general farms and $33,000 on hog farms. When the labor income was computed, hog farms had an average annual labor income of $4,200 per man as contrasted to dairy farms with $2,100 and general farms with $2,400. Labor income is determined by adjusting net cash income for inventory changes and then deducting interest on the total capital investment.

The average size of farm, another measure used to compare types of farms, was 169 acres on dairy farms, 206 acres on general farms, and 230 acres for hog farms. Farmers were advised to consider their physical resources such as size of farm, quality of land, labor supply and capital resources before changing their present systems of farming. Each type of farming has circumstances where it is best adapted, and when the type of farming has been fitted to physical resources, higher than average farm earnings are usually obtained when efficiency is higher than average. —*Purdue University*

The Town of Ham

Story of Smithfield Ham

Condensed From Nation's Business

Katharine and Henry F. Pringle

DOWN in the little town of Smithfield, in the tidewater country of Virginia, may be seen the Methuselah of hams. The human Methuselah is reputed to have lived 969 years. The venerable Smithfield ham is 50 years old, which is doing pretty well for a ham. Its owners, P. D. Gwaltney, Jr., & Co., are proud of their ancient piece of preserved pork. They keep it in a glass case in the lobby of their main building. It is insured for $5,000. Around its shank is a brass collar with a chain, so that it can be securely fastened when the ham is exhibited at state fairs and food shows. On such occasions a guard is also posted for further protection against theft.

The aged Gwaltney ham, cured by the 300 year old formula which makes Smithfield hams like no others in the world, is supposed to be edible today. Certainly nobody can prove that it is not. Although somewhat wrinkled, the ham retains its rich, dark patina. The Gwaltney people insist that a sheet of paper, placed beneath it overnight, will still show the stain of peanut oil which is a characteristic of Smithfield hams.

The population of the town of Smithfield is only 1,200, with a probable total of 2,500 if the outskirts are included. The output of its sole product isn't very big, either. About 300,000 genuine Smithfield pieces are turned out annually, along with, nowadays, a considerable number of run-of-the-mill hams and pork products.

In the early days of the Virginia colony, ship captains from England were commissioned to take on a cargo of hams at the Port of Smithfield, then a bustling trade center on the Pagan river, which flows into the James and on down to Norfolk and the sea. The hams went to all countries of the world and they still do. They appear on the menus of the great hotels of London, Paris and New York.

The four firms which can cure ham in Smithfield today can produce testimonials galore. The

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Washington, D. C.

celebrated restaurateur, George Rector, declared that Smithfield ham was the best in the world. Mrs. Woodrow Wilson presented Marshal Joffre with one as a memento of his visit to the United States during World War I.

"Kings, princes and potentates are the patrons of Smithfield ham," is the boast of the packers. The claim doubtless is justified. It is persistently rumored in Smithfield that two hams a month are shipped to Buckingham Palace, but nobody will say for a fact which company enjoys this royal patronage.

The people of the tiny town are deeply interested in their history. The original colonists brought hogs with them — perhaps the Hampshire breed which is preferred for Smithfield hams today —and they quickly developed a method of curing the meat so that it would keep through the hot American summers. Within a few decades the little port which grew up on the south shore of the James was making a specialty of hams, and early residents built their houses with deep cool cellars where the cuts were hung for aging. Apparently it was not until after the Revolution that the first commercial sized business was started.

Hardly bigger than at the turn of the century, Smithfield is today a pleasant blend of history and practicality. Its few streets are lined with prosperous looking homes of simple eighteenth century design or Victorian ornateness. It boasts but one hotel, the Sykes Inn, the main building of which has been a hostelry for 200 years and which specializes in Smithfield hams, perfectly cooked.

From mid-November to March in Smithfield the air is pervaded with the pungent odor of hams being smoked over oak, hickory and apple logs. A characteristic sight is that of trucks loaded with squealing porkers rumbling along Church or Main street, en route from other parts of Virginia, North and South Carolina and as far south as Georgia. For the succulent pigs which grow up to become Smithfield hams are not raised solely in the locality. Before railroads were built, thousands of hogs used to be driven on foot even from Kentucky and Tennessee.

For generations packers and farmers in several of the southern states have cured hams by essentially the same method as that used in Smithfield. Virginians, Kentuckians, Tennesseeans and Missourians argue jealously over whose ham is the most delectable. But there is no doubt in the minds of Smithfield residents that their ham has special attributes. They have even had a strict legal definition of what constitutes a Smithfield ham inserted into the statutes of the soverign Common-

wealth of Virginia, as follows:

Genuine Smithfield hams, sides, shoulders and jowls . . . are cut from the carcasses of peanut-fed hogs which are raised in the peanut belt of the State of Virginia or the State of North Carolina, and which are cured, treated, smoked and processed in the Town of Smithfield.

The law had a dual purpose. One was the laudable aim of keeping imitations from being labeled "genuine Smithfield." The second was to preserve a tight little monopoly. The law is observed in the breach, both as to sources of hogs and, to a limited extent, as to place of curing. The peanut belt has since been extended to South Carolina and Georgia. And Smithfield winks at the fact that one duly recognized packer has his plant outside the town's corporate boundaries, though there was a time when he had to go to a great deal of trouble to locate it geographically within the law.

The method of processing this aristocrat of hams is much the same today as it was in the age of Pocahontas. The machine era has made little difference. It is still a hand operation. The green hams are first covered with salt and stacked, under refrigeration, for a month or more. Then they are scrubbed and rinsed, one by one, in steaming tubs of water before being hung in the smoke houses.

The hickory and apple logs give their flavor to the hams; oak wood contributes the dark mahogany color. After two to four weeks of smoking, depending on the weather—which should be dry to allow the smoke to permeate the meat—the hams are rubbed with black pepper and suspended in well ventilated frame lofts to age through the spring and summer.

A shed with thousands of hams hanging from the rafters is a noble sight to the eye and fragrant to the nose. The law specifies that they may not be sold until they have hung for five months. The Smithfield packers prefer to age theirs for eight months to a year.

Like other southern, country-type hams, the Smithfield variety is a flat, elongated cut with a skin almost black from oak smoke and pepper. When cooked, its meat is lean, dark red and firm. The fat is oily and yellow, compared with ordinary hams, and the distinctive rich and smoky flavor might even seem salty to the uncultivated palate. Smithfield people admit graciously that Virginia hams cured by a similar process outside their sacred limits may also be good. But they claim that their insistence on peanut feeding makes their own product

inimitable, as does some special magic in the Smithfield atmosphere that they don't try to explain, except to suggest that it might be the salt air blowing in from the Chesapeake and the sea.

Certainly they have managed to attach magic to the name. Other producers of dry-cured hams have paid Smithfield the compliment of slipping it somehow into their labels or advertisements. A typical offering reads like this one:

> Curer of Olde Virginia Hams, Smoked and Cured in the Olde Indian Way. Smithfield Style.

Filling stations in the area sell "Smithfield type" hams for about half the cost of the real thing; often they are not half as good, either.

A number of notions, not all of them well founded, have developed about the pigs which ultimately became Smithfield hams. It seems likely that the early colonists' pigs interbred with the razorback hogs. The result was a small, lean animal which became the traditional basis of Smithfield hams.

In any case, until the age of fences the farmers allowed their pigs to roam at will during the summer months, living on acorns and hickory nuts. Their owners did not see them until they came home in the fall for food. At that point they were turned into the fields to root for the peanuts left in the ground after the harvest—for peanuts were being grown in the southern colonies by around 1700.

The razorback has vanished, and the embryo Smithfield ham is not so very different from other pigs. Usually it is somewhat smaller and slimmer than the Iowa corn fed hog. John Barlow, an Isle of Wight County farmer who sells all his stock to the Gwaltney company, told us that any good healthy pig was acceptable—if it was peanut fed.

Pigs, any raiser will tell you, are the most intelligent of animals. Mr. Barlow explained that his hogs never ate more than was good for them, although the bins were always left open. He also feeds his pigs prepared pellets containing all the necessary vitamins. In addition, they eat soybeans, alfalfa and corn for fattening. But the essential step in the Smithfield ham diet is still to send the hogs in to glean after the peanut harvest.

"As a matter of fact," another hog raiser told us, "a hog practically raises itself."

Smithfield has no rail connection to this day, and partly for this reason the town has remained small. The fact is, its citizens like it that way. Smithfield is a snug little community. Everybody knows everybody else's business. If their forebears didn't come with the first wave of hardy pio-

neers who landed in this wilderness three centuries ago, they moved in not long after.

The real money began to come in to Smithfield during the 1870's and 1880's. That was when the packers built the huge houses on Church Street with their turrets and gingerbread decorations. These outsized homes are still lived in and are in excellent shape.

The mechanization of the surrounding farms has released enough labor, skilled and unskilled, for the ham industry. Wages are good, although not quite as high as in packing houses located in metropolitan areas. But then the cost of living is not as high, either. Smithfield has no unions; the workers turned down a chance to organize some years ago. If a man has unexpected expense, such as serious illness in his family, the bosses see to it that his bills are paid. Such is the tradition there.

The Smithfield packers tend to be snobbish about their product. It is a luxury item, but the hams are far from limited to kings, princes and potentates. They are hardly, however, the ingredients of sandwiches at the corner drugstore.

The packer these days has to pay 45 to 50 cents a pound for his green hams; to this he must add at least three cents a pound for curing. The black pepper which is an essential part of the processing now costs $1.95 a pound as compared with four or five cents before the war. Eight ounces, more or less, of pepper are needed for processing each ham.

Moreover, the hams lose about 30 per cent of their weight during the aging.

It hasn't all been easy for the gentlemen of Smithfield. To a large percentage of consumers a ham is a ham, and they are scandalized by the prices of the Smithfield variety.

During the depression price problems forced some of the old firms to drop out of business or to sell out. To avoid a similar disaster J. C. Sprigg, the enterprising president of the young Smithfield Ham & Products Co., has developed a sideline of specialties like deviled ham and barbecued pork, which constitutes a profitable backlog.

Gwaltney's and Luter's have expanded into the general pig slaughtering and packing house business, so that by now bona fide Smithfield hams make up only about 17 per cent of their output. But this is still their pride and joy. They figure that Smithfield hams are still the heart of the operation—partly for the practical reason that they do not have to be sold during a slumping market, since they can be held more or less indefinitely, though perhaps not for 50 years.

Managed Woodland Makes More Timber

Condensed From Soil Conservation

Lester Fox

H. C. SWAFFORD loves the woods and regards his woodlands as a public trust.

A native of Tennessee, he came to Stone County, Arkansas, around 1920 and homesteaded a quarter section. He had only a mule, a doublebit ax, five bushels of corn and 35 cents.

The quarter section was covered with trees, mostly hardwoods of no commercial value. Young Swafford cut enough pines to build a log cabin for his wife and baby. He went to work in the forest for a lumber company and began to develop a reverence for the woods.

Today Swafford owns 4,000 acres in Stone County southeast of Mountain View. All of it is in woodland except 250 acres of improved pastures for his 50 head of beef cattle. Timber is his main crop and principal source of income, something rare among northern Arkansas farmers, though the area is thickly wooded. His five sons have an additional 1,500 acres of woodland. They work with their dad in operating the 5,500 acres as a unit.

Swafford has his own sawmill and cuts 100,000 board feet a year. He will increase his cut as his pine stand improves. He operates with three tractors, two trucks, a power hand saw, and other mechanical equipment. Economical production is his aim. He can figure quickly in his head whether he can make more by sawing a border-line tree into boards or selling it as a pole.

Swafford has always handled his woodlands with an instinctive understanding of conservation principles. He has protected his forest against fire and encouraged the growth and spread of commercially valuable pine trees by keeping grazing animals out of his woodlands. He also realized that periodic thinning was a good conservation practice.

But it was not until Swafford became a co-operator with the

Reprinted from Soil Conservation
Washington, D. C.

Blue Mountain Soil Conservation District a few years ago that he acquired an understanding of the principles of managing a woodland to make it better and keep it productive permanently.

He has been given on-the-ground help by SCS foresters and other technicians. From them he has learned how to select trees for thinning and how to apply the "D plus 6" formula by which he can figure quickly how much growing space each pine tree needs. All he does is add six to the diameter of the tree and multiply that sum by itself. "If a pine tree is four inches in diameter, you add six to that and get 10," he explains. "Then you multiply 10 by 10 and get 100. That means the four inch tree should have 100 square feet of growing space. With this formula I can thin my woods and take out the trees on a scientific basis. There's no hit-or-miss about it."

Swafford has also learned that to improve his timber stand and give pine trees a chance to spread he has to kill the large overtopping hardwood trees by girdling.

In 1930 Swafford cut pines from 30 acres of his original homestead to get lumber for a new home. Ten years later he cut the same 30 acres and took out 60,000 board feet.

"I didn't cut close," Swafford says. "I could go back in that same 30 acres now and cut out 25,000 feet and leave 75,000 feet. That's a lot more than I had there 10 years earlier, when I had to take every pine four inches in diameter or bigger over the whole 30 acres to get enough lumber for the house—less than 2,000 feet. And about the only pines in the whole quarter section originally were in those 30 acres. That's proof of how you can increase pine growth with a little care and management. I estimate I'm growing 200 board feet per acre per year on that 30 acres, and production will increase to 300 feet. Our whole 5,500 acres are improving in the same way, though it's not all producing at the rate of the 30 acres yet."

As part of his conservation plan, Swafford has divided his woodland into seven tracts of about equal size and plans to cut each tract every seven years. His schedule has been hindered for the time, however, by ice which did an estimated $10,000 damage to his pine trees in the winter of 1951-'52. The ice bent and broke hundreds of trees. Swafford has been busy removing the damaged pines as salvage.

Swafford's pines have increased tremendously with the good care he has given them. Without boasting he tells you: "I have more pine timber on my land than there is between here and Heber Springs."

That is 27 miles.

Look What They're Doing Now!

New Wonder Drugs and Chemicals May Soon Bring Bigger, Earlier Crops

Condensed From American Agriculturist

Jim Hall

IF YOU plan to go on farming, you'd better set up a file in your farm office for "Chemicals and Their Uses," because we're just beginning to see what industrial chemists and research men are developing for agriculture.

I've seen some things that make me realize I'll never catch up on what's new in farming. I thought I was right up to date. I didn't think I'd find much new and important when I went with 30 other farm paper editors on a tour of the New York - Connecticut metropolitan area.

We went to see what was new at Lederle Laboratories, at the Naugatuck Chemical division of U. S. Rubber, and at the Chas. Pfizer Co. You know what Lederle's aureomycin will do to stimulate the growth of pigs; what some antibiotics will do for mastitis; what aureomycin will do for calf scours and calf growth; and that several of the antibiotics will make poultry ready for market weeks earlier—but I learned that the *chemists are just getting* a *start with antibiotics.*

We had a conference with young Dr. Louis Nickell of Pfizer the day after he announced that *antibiotics stimulated plant growth!* Trials haven't gone far enough yet to know what effects this will have on yield, as they've only tried it on a few plants—corn, radishes, sorrel and pansies —but something happened:

Dr. Nickell showed us what happened with corn he tested: Seeds in one flat were watered with ordinary tap water and the other got water containing five parts terramycin to a million parts water. There was 16 per cent more germination with the antibiotic. In just four weeks, the treated corn averaged about three and a half inches taller than the untreated and weighed twice as much both on wet and dry basis. His radishes averaged from two to three times as large when he treated them with penicillin!

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Ithaca, New York

There'll be lots of field tests following Dr. Nickell's trials. Yield might be increased but, even if it isn't. just think what it would mean if the quicker growth means earlier maturing crops.

Miracle Workers

Hundreds of antibiotics have been discovered since penicillin—and laboratories are finding more and more. Some are miracle workers in human medicine but there are many, many others whose possibilities haven't been probed. Somewhere along the line they may find something that will have such an effect on growth as to make Jack's bean stalk look like a scraggly little weed!

But that's not all that's in the news: Antibiotics are also proving to be fungicides! The USDA is getting remarkable control of bean blight with streptomycin, and the same antibiotic has given as much as 60 per cent reduction of fire blight in pear trees. So now we know that in the very soil under us are antibiotics that control both disease and growth in plants as well as in animal life.

How would you like to plant such crops as cucumbers, cantaloupes, squash, asparagus, snapbeans, sweet potatoes, carrots and onions, spray a little stuff over the area and then not have to worry about weeds for three to eight weeks?

How would you like to spray a little stuff on your lawn and only have to run the lawn mower twice next year instead of 20 or more times? Or spray a little along the edges so's the grass wouldn't grow out into the flower beds?

I saw at the Naugatuck Chemical Co. greenhouse at Bethany, Connecticut, that you'll *probably* be able to do those things within a year! The two new products are not on the market now. One of them, called "MH" for short, is a growth inhibitor. With it grass will stay green but grow very slowly—a boon to highway departments with the job of keeping roadside shoulders mowed; with it, blossoming of fruit trees can be retarded until danger of frost is past; when used on potatoes, beets, onions and other root crops just before harvest, it just about eliminates sprouting in storage.

The pre-emergence weed killer for vine crops is called Alanap and while it doesn't hurt the crops I mentioned above, it is effective against such common weeds as pigweed, purslane, lambsquarters, quickweed, chickweed, ragweed, carpetweed and crab grass.

Research is time consuming and takes plenty of money. Naugatuck, owned by U. S. Rubber, decided to enter the agricultural chemical field back in the thirties—in order to diversify its products. In making Spergon, the first organic chemical developed to

combat fungus diseases (and which is used as a seed protectant), they first screened more than 3,000 different compounds. They are continuing to screen 1,000 compounds a year for possible use by the farmers! In addition to Spergon, they have Phygon, pretty well known now as a foliage spray for fruit trees and row crops and proven to be very effective against apple scab, brown rot in peaches, and late blight in tomatoes. Aramite is the third product that has come out of what basically is a rubber company. It has proven to be very effective in controlling mites in orchards, various shade and evergreen trees, grapes, beans, alfalfa and clover.

There are hundreds of other places across the nation from the Du Pont plant in Delaware to the oil industry's laboratories on the west coast where research men in private industry are developing new things for farming.

Blend of Three Varieties Makes Best Apple Cider

A blended juice from three apple varieties makes the best cider in the opinion of Purdue university horticulturists.

By using a taste panel composed of exacting specialists who believe they know how ideal cider should taste, E. E. Burns and N. W. Desrosier arrived at a blended juice composed of two parts Grimes Golden, one part Jonathan and one part Delicious apple varieties.

Juices from these varieties and in these proportions had the highest taste appeal. Single varieties which made suitable cider included Grimes Golden, Stayman and Golden Delicious.

Research to determine the most suitable blend of apple varieties to make cider wasn't actually quite as simple as assigning some finicky tasters to the job. Derosier and Burns chemically analyzed apple juices for their sugar, acid and tannin content. Relative ranking of 17 different varieties for these constituents was the same for two seasons.

They found that apple juices containing 14.5 per cent sugar, 0.46 per cent acid and 0.038 per cent tannin made the best tasting cider. Apple juices changed in composition while being squeezed out of the apple pomace. Maturity of the apples affected their chemical composition, too. —*Purdue University*

Newcastle disease, one of our worst poultry hazards, can also affect human beings. Persons working with infected flocks may develop the infestion in their eyes.

Guideposts for a SUCCESSFUL FARM BUSINESS

Condensed From Iowa Farm Science

H. B. Howell

Associate Professor of Farm Management

WHAT makes a successful farm business? Production techniques are fairly easy to learn. But the art of using these techniques, together with the resources you control, is what makes a successful farm business.

Your resources are land, labor, capital—consisting of feed, livestock, supplies, machinery, equipment and buildings — and managerial ability. Your supply of each of these resources is limited at any one time.

You have a different combination of these resources than any other farm operator. You can gain control of land, labor and capital resources by renting, hiring, borrowing, buying or inheriting. The management resource is the one you gain through training, experience and environment. On most farms, managerial skill or lack of it probably limits success more than any other single factor.

Management Decisions

In any farm business, you are continually making management decisions. Many are day-to-day decisions; others are for a long period of time. As a basis for these decisions, you have your knowledge of the physical characteristics of the resources you have available—their cost and the expected return both in physical production and value — and a knowledge of your personal preferences and ability.

Not Enough . . .

It's not enough to know what kind of soil conditions give what kind of yield responses when fertilizer is added. In addition you need to know the cost of the fertilizer and equipment and labor needed to apply the fertilizer. And you must put a value on the resulting increased production to see whether the application will be profitable.

Management still would be

Reprinted from Iowa Farm Science
Ames, Iowa

simple if it stopped there. But there are other things to consider, too. Would you get a greater return from using your resources in adding fertilizer than from using the same resources in some other part of your business?

Simple and Complex

Some management decisions are simple; others require a high degree of skill. Using your resources to buy a better variety of seed oats is a relatively simple management decision. The amount of grain to feed a herd of dairy cows to get the most income from your entire farm business (of which the dairy enterprise is only a part) is a more difficult decision.

What would be the risk and income possibilities if the resource used in your dairy enterprise were used for a beef cow herd or in a hog enterprise? This is even more complex. But, simple or complicated, such decisions must be made and are made in running a successful farm business.

Always Changing

An individual farm business is an always-changing, dynamic business. It changes with new technological developments—with changing price relationships of resources used and products sold—with variable weather conditions—and with the increasing skill of the operator as he gains experience and capital to work with.

In other words, the farm operator must continually question his managerial decisions. He must find out if there is any other combination of land, labor and capital that will use his managerial skill more effectively and give him a greater return than the combination being used.

Can machinery be substituted for labor to reduce costs or increase the value of a product? Would a different rotation give more total production from the farm? Can milk production be increased enough to cover the added feed costs when the amount of grain per cow is increased? Would it be more profitable to feed steers less grain and more roughage and use the grain saved in hog production? Would additional power pay for itself through higher production by getting the job done at the right time?

These are only examples of some of the many management decisions made in conducting a successful farm business. But they indicate the interrelationship of all parts of the business when management is put to the task of getting greatest income.

No Single Enterprise . . .

In farm businesses that are single-enterprise businesses, or so-called one-crop farms such as a tobacco farm or a cotton farm, the allocation of resources is relatively easy to figure out. In the

Corn Belt, however, most of our farms have many enterprises. These enterprises are complementary, supplementary and competitive in terms of using physical resources and managerial ability. And our decisions are much more involved. *The basic management job is to decide how to use scarce resources in such combinations so as to give the greatest net return.*

Study Shows Reasons

A study of the 1951 farm records of 459 Iowa farms ranging in size from 140 to 260 acres (averaging 190 acres) indicates the major factors that characterized a successful farm business last year.

These 495 farms averaged 136 acres of intertilled crops, small grain and hay per farm. They produced $8,057 worth of feed per farm, processed most of it through livestock and produced $16,571 worth of livestock from the feed raised plus some purchased. The farms averaged 17.5 months of operator, family and hired labor in doing the job, had $3,900 of operating expenses and a net farm income of $7,600 per farm. (About half of the farms were tenant operated, and the net income per farm includes the net income of both the landlord and the tenant on rented farms.)

Four Factors . . .

In making this study, we used four factors to measure various phases of the farm business: (1) *gross value of crops per crop acre* as a measure of the cropping system and yields; (2) *livestock increases per $100 of feed fed* as a measure of the success of the livestock enterprises; (3) *gross profits per man* as a measure of the volume of production per worker; and (4) *machinery and power costs per acre* as a measure of efficiency in the use of machinery, equipment and power.

We rated each of the 495 farms on these four factors as compared with the average of the farms of the same size and in the same area of the state as those from which the farm records were obtained.

To measure the effectiveness of using all of the resources available to the operator, we used the management return, rather than net farm income, as a measurement of profit. The management return is the amount left after charges for operator and unpaid family labor and interest on the equity in capital and land used are deducted from the net income. The management return on the 495 farms averaged $3,200 in 1951.

The Difference . . .

The table shows the difference in management returns between the farms with all four of the efficiency factors rating average or above and those with three, two, one and no efficiency factors rating average or above.

Returns Based Upon Number of Efficiency Factors Average or Above (495 farms, ranging from 140 to 260 acres in size, 1951)

Number of factors average or above	Number of farms	Management return
Four factors	44	$7,545
Three factors	135	5,690
Two factors	157	3,056
One factor	121	460
No factors	38	—1,355

Of the 495 farms, 44 rated average or above on all four factors, and 38 rated below average on all four factors. The 44 farms rating average or above on all four factors had a management return of $7,545 as compared with a management *loss* of $1,355 for the 38 farms rating below average on all four factors — a difference of $8,900.

The array of income from four factors average or above to all factors below average indicates that it was necessary to have a farm business relatively efficient in all segments to achieve high income under conditions as they were in 1951. On the other hand, the difference does not indicate the relative importance of the various efficiency factors in making managerial decisions.

Efficiency . . .

We found little difference in profits between the farms with average or above crop returns and average or above feed returns. The farms that were average or above in gross profits per worker had a return of $5,582—or $423 above those with average-or-above feed returns and $635 above those with average-or-above crop returns. But the farms that rated average or above on machinery and power cost per acre, regardless of how they ranked on the three other factors, averaged a return of only $3,105 —which was $2,477 below the average of the farms that were average or above in gross profits per man.

High-Level Production

Considering this information and remembering that it was obtained from farms above the state average in income and resources and under 1951 crop and price conditions, one fact stands out. *A high level of production per worker* as measured by gross profits per man was more important in determining the profitability of the farm business than holding machinery and power costs to a minimum.

High-level crop production and efficient livestock programs ap-

pear to carry about the same weight. But neither rates as high as the amount of production per worker. Still, both an efficient livestock program and high crop production rated higher than minimum machinery and power costs.

Its Meaning to You

The relative importance of the four factors—which in a broad way measure the efficiency of the use of land, labor and capital resources—is important to the farm operator in planning his farm business. The way the factors line up indicates that, if you have land resources that will give high production and the capital and ability to manage a livestock enterprise, volume of production per worker and above-average crop and livestock efficiency are more important than holding machinery costs to a minimum. Additional machinery costs that will assure high yields and timeliness and reduce labor requirements can increase profits under these conditions.

But if your land resources are such that you can't achieve high-level production even with added capital and management—or if a lack of capital or ability makes it impossible to achieve good livestock efficiency and high production per worker—then minimum machinery and power costs along with other minimum operating costs do become essential if you're to make top profits.

A Reasonable Goal

Enough production per worker to cover expenses and to provide a desirable level of living, security and some leisure time is a reasonable goal for a successful farm business. To achieve this goal, your business must have adequate volume, use scarce resources efficiently and be flexible enough to meet the changing economic conditions and the adoption of new techniques.

These are the elements of a successful farm business—not only the mastering of production techniques but also the art of using these techniques together with the resources you control to produce maximum satisfaction and income.

Forty years ago, it took 35 man-hours to produce an acre of corn yielding 26 bushels (U. S. average); in recent years (1949-'51) it took only 17 man-hours per acre and the yield was 38 bushels. To produce 100 bushels of corn 40 years ago, took 135 man-hours; in recent years only 45 man-hours were required.

Productive Fields From Neglected Acres

Condensed From National Fertilizer Review

Robert M. Engle

HERE'S a story of what a businessman has been able to do with a worn out farm. The sort of miracle he has performed may be within your powers, too.

That is why it is important to know about F. B. Davis, jr.'s work in transforming neglected South Carolina acres into richly productive ones. A retired business executive, Mr. Davis has brought business methods into play for carrying out his task.

After examining his sandy Coastal Plains soils, Mr. Davis proceeded to get the facts about every conceivable way of improving them—from the various agricultural colleges, from fertilizer producers and from successful farmers. The information, once assembled, showed that a plan could be adopted for turning some 30 of these acres into the production of alfalfa. A newer crop for the area, alfalfa could provide fine feed for cattle, supplement winter grazing and insure an adequate supply of feed should adverse weather conditions seriously reduce open grazing. So successful has alfalfa been as a hay crop that the acreage was rapidly increased to 110 acres.

Plant food was quickly recognized as an essential to provide alfalfa for hay and for lush grazing pastures. The soil had to be prepared for its job. Two tons of liming material was applied to the acre, and 1,000 pounds of 4-8-12 fertilizer with 20 pounds of borax was put down to build up the soil's plant food content.

Top quality seed was planted in the fall at the heavy rate of 30 pounds per acre, and the fertilization program was continued in the spring with 500 pounds of an 0-10-20 applied in February and again following the first cutting of a fine crop. Each succeeding year fertilizer was applied in the same amounts and at the same rates.

Every step of the work was carefully planned. Curing and storage had to be carried out

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Washington, D. C.

along businesslike lines and that meant mechanizing every operation. Efficient, swift moving machines help to preserve valuable protein, vitamins and carotene found in alfalfa.

Cutting time is determined on the basis of long range weather reports. A method of artificially drying the hay, involving little expense, has been developed and this assures good curing even under adverse weather conditions.

Alfalfa grown and processed in this way materially increases the feed value of the hay and, equally important, it reduces the grain bill for keeping beef and dairy herds in high production.

The pasture angle is worth attention, too. Each acre is seeded to a mixture of two and a half pounds of Ladino, 25 pounds of Dallis grass, three and a half bushels of oats, and 25 pounds of Italian rye grass. Fertilizer is added—1,000 pounds of 4-12-8 in the fall and 40 pounds of nitrogen and 75 pounds of potash in the spring. Response to boron in all pastures containing clover was such that 10 pounds of borax per acre is now being generally applied. The results—good grazing virtually the year round.

So impressed has Mr. Davis become with his program that more and more acres are gradually being turned over to pastures. The profits support his decision.

The per acre costs for alfalfa hay as feed alone are these:

Fertilizer and liming	$45.80
Reseeding and insect control	17.00
Harvesting, drying and storing	25.50
Total cost per acre	$88.30

With an average of five tons of dried hay produced per acre per year (the minimum over four years) the over-all cost per ton turns out to be $17.66.

Since a recent market quotation for this type and quality of hay is $64.50 per ton f.o.b. cars at destination, *the net operating profit is $46.84 per ton, or $234.20 per acre per year.*

Impressive as these profits are, it is certain that the income from grazing cattle is even larger. This is because the present high cost of labor needed to harvest and bale hay is eliminated. Cattle themselves do all this work.

Mr. Davis' experience is a real contribution to agriculture in the Coastal Plains area and gives new heart to farmers there who seek a way to make productive fields from neglected acres.

It's the drafty barn, not the cold barn, that gives calves the most trouble during winter weather, according to veterinarians in the Illinois college of agriculture. Calves usually do well in cold weather if they aren't chilled by sudden temperature drops.

Grass the Money Maker

Condensed from a chapter in the new book, "Grasses and Grassland Farming," by Dr. Hi W. Staten, Oklahoma A & M College and published by Devin-Adair Company, 23 East 26th Street, New York City. Price $5.00.

IN TERMS of income, grass is the most important agricultural crop. Such being the case, one would assume that the livestock men and state and federal bureaus would have given much thought to grass protection and improvement. On the contrary, although millions have been invested in breeding corn, wheat, cotton and other soil depleting cash crops, only a few thousands have been tagged for research on grasses. In one state, as late as 1942, less than $500 was spent annually for grass and pasture research.

The situation is likely to change, however. The relation between good grass and beef is becoming clear to farmers and ranchers who in the last five or six years have discovered that finished beef can be produced on grass. Ranchers learned during World War II that cattle could be sold for slaughter directly from the good ranges, provided they were held until they were at least two years old and had had access to good pasture for a long grazing period. People have argued that this cannot be done, but ranchers are doing it.

The farmers of the Cotton Belt are regrassing worn out, eroded hillsides. The acreages which once grew cotton, tobacco and peanuts —soil depleting crops—are being planted to year round green pastures for the purpose of producing beef and dairy products. In this section, where green and nutritious grass can be produced 12 months of the year, a good pasture can produce as much as 500 pounds of beef per acre and at a cost which is only about half the average cost of summer grazing and winter feeding or finishing. These year round grazed cattle will go directly to market as slaughter cattle. Corn fed beef is slightly better, but cattlemen are learning that it is much cheaper to produce beef by the pasture system. In other sections, where the winters are more severe, some feeding must be done, but by good pasture management the cost of production can be materially reduced.

A survey covering 15 states made by USDA workers shows definitely that the cost of producing beef on pastures is only about 50 per cent of the cost of the cheapest kind of feeds. It requires more time for steers to finish on pastures than in the feed lot, but the farmer with well managed, permanent pastures doesn't have to hurry.

What this means in terms of the individual farm is shown by the experience of Fred DeMier, a young businessman of Miami, Oklahoma, who decided to buy a farm because he felt the country was a more wholesome place than the city to rear his family. He paid $30 per acre for 420 acres of upland prairie soil which had been worn out by cash crop farmers. The soil was acid, low in phosphate, and low in organic matter, and showed a bare trace of nitrogen. The topsoil was two-thirds gone and the subsoil was a heavy hardpan clay. Some of the land was rolling prairie and other areas were very flat and water logged. Only a few gullies were perceptible. Sheet erosion and not gully erosion had caused the greatest damage on this farm.

The neighbors told Fred he had paid two or three times more than this land was worth and that he would starve out in a few years. This did not deter him, however, because he had a desire and a plan. Through the advice of the pasture specialist from the college and the county agent he started liming the soil, applying phosphate, plowing and seeding to a mixture of rye grass, fescues, Ladino clover, Korean lespedeza, big hop clover, Reed canary grass, redtop, alsike clover, sweet clover and Kentucky bluegrass. These crops were varied according to the condition of the soil. The level, seepy areas were seeded to a mixture of annual rye grass, Reed canary grass, Ladino clover, redtop, and alsike clover. His primary aim was to follow a plan that would give him three or four pastures, so that he could move his livestock from pasture to pasture from season to season and have green grass the year around. The plan aimed at the long sought for goal of cattlemen: Raising beef with a minimum amount of feeding.

His neighbors told him there was no such thing as a year round pasture in his section because of the droughts during July and August and the extreme winter weather in January and February, but he continued to plan and work. He soon discovered that the soil responded to good treatment, that a layer of old grass residue was the best soil conditioner, and that an accumulation of organic matter helped to whip the July and August droughts. He loved to walk over his pastures and feel his feet sinking into loose

and mellow turf. He soon was digging into this turf with his bare hands and noticing the black soil filled with organic life.

All these things worked together and toward a common end —a fine pasture for his whiteface cows and calves. He learned that good land management meant good pastures, and that if he used the right combination of grasses and legumes, he could have a green pasture anytime during the year, regardless of the severity of the winters or the dryness of the summer.

Within five years Fred had every acre of his farm planted to a pasture mixture which would meet the soil and climate conditions for producing beef. Every acre had been treated with lime and phosphate as was needed.

Soon he was harvesting beef from those worn out acres. The grazing load was low the first year or so, but he did not have to wait long until every acre of those fine pastures was producing 200 to 250 pounds of beef. Beef was produced during spring, summer, fall and winter. Snow and freezes have come, and green pasture has not been enough to put on the desired gains, but Fred has a few bales of alfalfa hay and a few pounds of cottonseed cake on hand to pull the steers through these periods and keep them in prime condition and gaining every day. The cost of feeding hay and

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cake on a good pasture is small compared to dry feeding during the entire winter and sometimes during a dry summer.

The price Fred paid for his land would have been too high if it had been used for corn, oats, soybeans and wheat; but with good pasture continually building the soil, making a seed crop, protecting the land from erosion, and at the same time producing 200 pounds of beef per acre, even if he had paid twice as much he would still have a profitable investment.

In other states, tests have been made of grass fed beef. At the Colorado agricultural experiment station, three lots of Hereford steers which averaged 650 pounds at the beginning of the experiment were fed. Each lot was fed five pounds of ground barley and corn daily; but one lot was fed alfalfa hay in a dry lot, another was fed alfalfa pasture, and the third lot was fed on mixed pasture. The three lots did not vary greatly in dressing percentage. There was little difference in the palatability of the roasted ribs; the greatest difference was in the fat flavor, the steers on the mixed pasture being the most desirable in this respect and the alfalfa pasture fed steers the least desirable.

Four groups of three and four year old Hereford steers were given the following feeds on the Kansas experiment station: Blue-

stem pasture, bluestem followed by a light grain ration on pasture, bluestem plus a full feed of grain, and bluestem hay in a dry lot plus a full feed of grain. The dressing percentages varied from 54 per cent for the cattle fed on pasture alone to 62 per cent for the cattle fully fed on pasture. No excessive, chilling shrink of the grass fed cattle was observed. Bluestem grass did not produce dark beef. The lean of the carcasses of all lots was a desirable red. No undesirable yellow fat was noticed in any of the lots, and there was no marked difference in the palatability of the meat from any of the lots.

What is grass, that it will do such a perfect job of producing beef, milk, mutton or pork? In its green pasture condition, and grown on fertile soil, it is highly palatable, tender and nutritious. It is especially high in protein, carotene and vitamins and generally contains sufficient quantities of minerals to take care of the body needs of animals. Green grass in prime condition of growth is a highly concentrated feed. The protein value of green grass on a dry basis is equal to about 75 to 80 per cent of 43 per cent cottonseed meal. The nutritive value of cottonseed meal is around 1:1.3 to 1:2.0. In addition to supplying protein, minerals and vitamins, grass seems to have other nutritive values, although little is known at present about them except that they are needed and apparently are not found in other feeds.

It is not only in the form of beef that grass has economic importance. Its market value as hay is illustrated by the story of James F. Secrest, a successful farmer and businessman of Coweta, Oklahoma, who owns 2,500 acres of native meadow land. These scattered meadows, one-fourth to half a section each, are located on what was rolling timberland interspersed with prairies. The sparse stand of trees has been removed, and for the last 40 to 50 years the land has been used as native grass meadows. Mr. Secrest says: "Neither a plow nor fire has ever touched my bluestem meadows and never will as long as I am alive." Fine bluestem grasses, big bluestem, little bluestem, with Indian grass, and switch grass make up the major fraction of the composition. One crop of prime prairie hay is cut each year, and the cutting is done in the early summer when the hay is in its best stage of growth. After the hay crop is taken, there is time enough for an aftermath growth and root reserve food building.

Farmer Secrest has no doubts about the economy of meadow farming: "I have never had a crop failure. Every year my land yields about one ton of prime hay per acre. I never have to worry about erosion, floods, insects,

plant diseases, and droughts or crop insurance before harvest. There is not a gully or raw land sore in my entire meadow holding. I never have to call on the county agent or the soil conservation poys to come out and run terrace lines or diversion ditches or to figure out how to plan my crop rotation system. The 'Triple A' boys do not need to pay me anything, nor do I ask for any help from the government in complying with the soil conserving practices. The fine meadow grasses are holding my soil and putting down more organic matter every year."

Mr. Secrest is a wise manager of land. He knew that while all the other land operators in his community in the early day were cutting and slashing, plowing and burning, sooner or later they would be needing hay. When all the native bluestem hay land was used up he would have not only hay, but his land. Sometimes his bank account was low and hay sold just barely above cost of harvesting; but when flood and hail, wind and rain came, his crop was either safe in the field or neatly stacked in the barn. Then when the big droughts of the thirties came, his land was rich in grass organic matter and the little rain that did fall was caught and held in the tons of black humus, where the young grass roots could use it in the renewal of top growth. The fine meadows were like a living bank account; the grass, building up root food reserve for next year's crop, was making deposits in the bank. The cutting of the hay was the checking account. The account was always in good solvent condition, because more was put in the soil bank than was taken out.

Insofar as grass is concerned, the continued production of large and ever larger numbers of livestock may be damaging or very wholesome. The outcome rests with the people who value grass and good pasture as highly as they value livestock. Many a "dyed in the wool" stockman at one time valued his cattle far above his grass, and for that reason the grass suffered. There are visible signs, however, that this attitude is changing. Although, in times of high prices and easy money, people tend to forget the things of nature which are basic to agriculture, today more and more men engaged in the livestock business are giving serious thought to soil fertility, grassland farming, and conservation of the soil and grass resources.

Shifts in the egg marketing picture in the past few years make it more important than ever to get chicks started early in the year. Illinois specialists advise starting chicks in January rather than in April.

BEEF CATTLE

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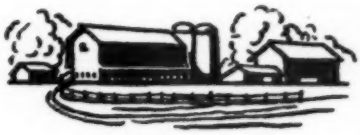
Looking Ahead Into 1953



FARM OUTLOOK for 1953 is good, but not quite so good as 1952. If changes in inventory values are considered, net incomes in '53 will be a little less than in '52. Farm purchasing power is sure to drop.

HOG PRICES will rise some in January. Spring peak will come in February or March. Plan now to increase your spring pig crop.

MORE CATTLE are on feed in the United States now than a year ago — but fewer sheep and lambs.

CATTLE AND SHEEP PRICES will average lower in 1953 than in 1952. Cattle slaughter will be up 10 to 15 per cent. A $30 top for choice steers next summer is most likely.

ALL THE INCREASE in cattle numbers in the past five years has been in beef cattle. There now are about 92 million head of cattle — a record for the United States.

DAIRY COW PRICES are down. In view of the relatively favorable dairy outlook, this appears to be a good time to buy that extra cow if you can find the necessary space, feed and labor.

— *Michigan Farm Economics*